THE IRON AGE

New York, July 5, 1917

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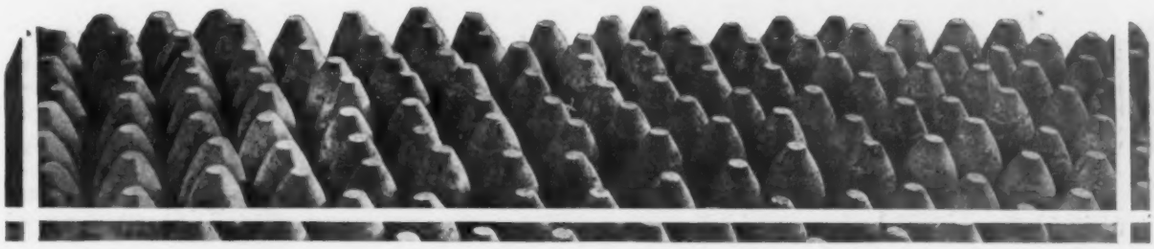
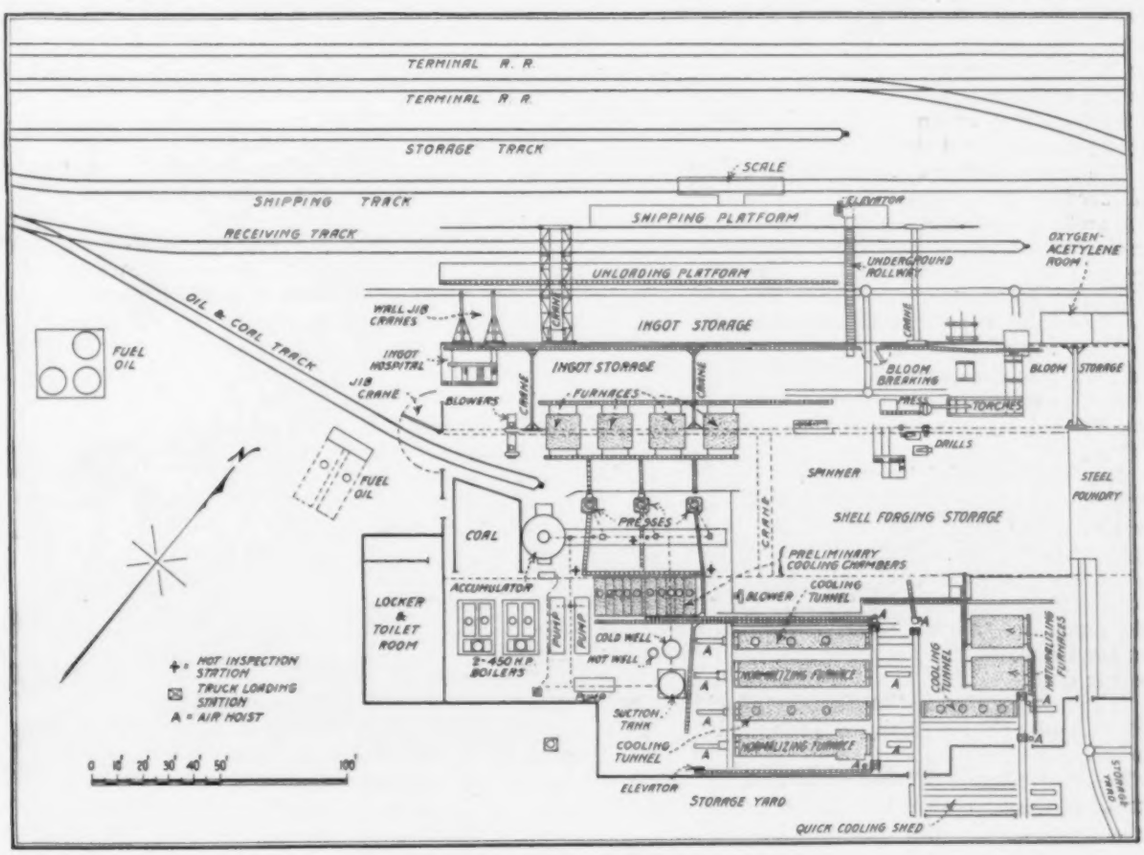
Forging Shells at Curtis Plant, St. Louis

Free Use of Patented Process Offered During the War Period—Valuable Contribution of Data on Shape of Slugs, Heat Treatment, Etc.

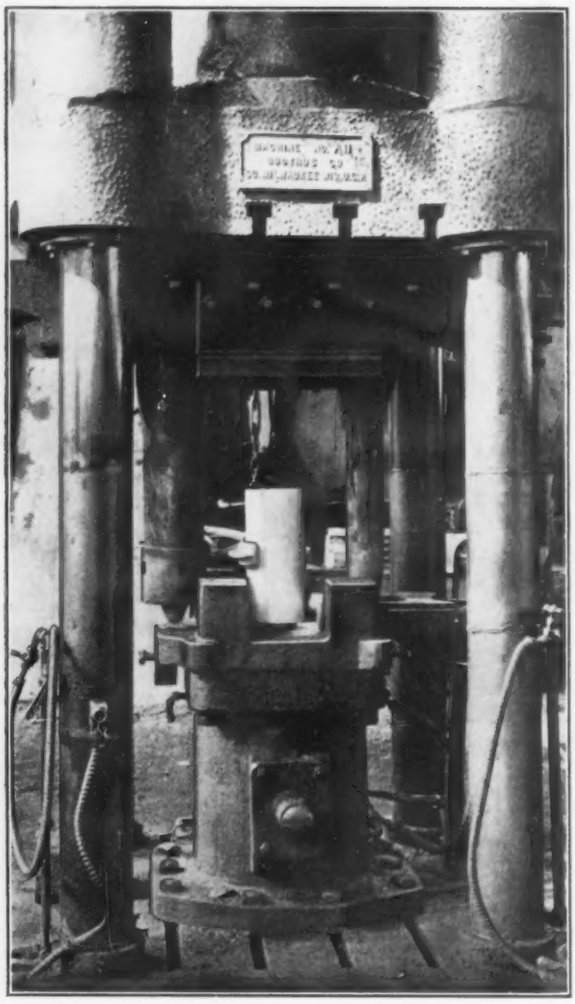


FREE use of a process of forming hollow forgings, patented by E. H. Steedman, vice-president of Curtis & Co. Mfg. Co., St. Louis, is offered to shell makers of the country with a view to expediting the production of munitions during the period of the war. Besides giving THE IRON AGE an opportunity to describe this process and to show details of the plants and equipment which it has been operating in making shells for the Allies, the company has also supplied generously a large amount of manufacturing data which are the result of searching investigations while reaching fully successful manufacturing operations.

Based upon the principle that horizontal forces acting on the piercing tool of the forging press must be in equilibrium so that uniformly concentric forgings may be obtained and that, if these forces are in equilibrium, concentric forgings must



No. 2 Plant of Curtis & Co. Mfg. Co., St. Louis



To the Left of the Hot Blank Being Received Is the Slugger and to the Right of it May be Noted the Piercer

result, Mr. Steedman claims to have developed methods and equipment which, irrespective of the shape of the bar from which the blank is taken, will produce uniformly good shells.

The press equipment embodying this principle and used in his process for the manufacture of 8 in. and 9.2 howitzer shells is shown in an accompanying drawing, all important parts being properly named. The heated blank received from a roller table leading to the press is fed into a magazine shown in one of the accompanying reproduced photographs and by it set down in the die. The blank so placed is compressed and centered by a slugger, so called; pierced by the piercing tool, and then ejected by the knock-out pin shown in the drawing.

The first essential to concentric forgings, it is emphasized, is the even and thorough heating of the blank, for otherwise no process or equipment can maintain equal side pressures on the piercing tool during the piercing stroke. The next essential is equipment, which covers the following three requirements, described in Mr. Steedman's application for the patent as the principles upon which his press is designed:

1. A compression or "setting down" of the blank so that the blank practically fills the die before it is pierced.

2. An ample size depression formed in the upper surface of the compressed blank concentric with the die to receive and center the piercing tool.

3. A true piercing tool concentric with the die.

The compression of "setting down" of the blank, which completely fills the die with metal, is done by the slugger's nose and the concentric depression in the slug is formed by the tit of the slugger nose at the same time the slug is compressed or "set down. A guide ring truly central with the die centers the slugger, and so long as the slugger fits accurately into this ring the depression in the slug will be commercially central.

The sectional drawing of the press shows the stops at opposite ends which provide lengthwise adjustment respectively to the sluggers and piercers, and the gib screws and the gibs in the top bolster, which provide means for the cross adjustment of the piercing tool. The slugger has independent cross adjustment by means of the slugger cross adjustment set screws. The piercing tool is cross adjusted first by means of the gibs and screws and the slugger later cross adjusted by its own set screws.

That the equipment is efficient in making concentric forgings is shown by the results set forth in the company's record, as follows: Out of 340,000 8-in. forgings, the total losses, exclusive of those due to bad steel, were 1.1 per cent, including only ¼ per cent due to eccentricity; out of 160,000 9.2-in. forgings, 1/20 per cent were scrapped due to eccentricity alone, with 8/10 per cent covering all forging losses except those arising from bad steel. These figures include forgings selected for tests and all rejections by the machiners except rejections for bad steel, and they are regarded as proving the importance of complying with all the conditions of forging mentioned in the foregoing and covered by the Steedman patent.

The location of the three forging presses of the company's No. 2 plant is shown in the accompanying plan where they form a part of a continuous manufacturing system by which the slug is heated, forged, inspected, cooled and heat-treated in a forward movement through the works and with minimum handling. Rollways and light overhead cranes constitute an important part of the equipment. Storage for the blooms is provided for toward one end; there they are broken into blanks by means of a press after being given preliminary oxy-acetylene cuts. At the opposite end of the plant a so-called ingot hospital is located. Here defective ingots and blanks are remedied. The storage of ingots and blanks is in the center near the unloading and shipping platforms.

The forging presses have a capacity of 60 to 100 forgings per hr.; they are operated hydraulically and are provided with rams of 36-in. diameter and 5-ft. stroke. Under each press is a pit in which a hydraulic cylinder of 7-in. diameter and 28-in. stroke operates the knock-out pin for rejecting the forging from the die. The accumulator in No. 1 plant, in which 8-in. forgings are principally manufactured, is loaded to carry 1,450 lb. pressure per sq. in. on the hydraulic system, giving a maximum of 635 net tons pressure to the presses. The accumulator in plant No. 2, devoted chiefly to 9.2-in. forgings, is loaded to 1550 lb. per sq. in. hydraulic pressure on the line, giving 675 net tons pressure. which is found ample to pierce at high speed a 9.2-in. shell forging after the blank is properly heated.

The pressure required to pierce a shell, it is explained, depends principally on two factors—the temperature of the steel and the cross sectional area of the metal pierced; and the influence of the latter was unsuspected in its practical effect. The first 8-in. forgings that were made experimentally did not have the proper exterior or interior finish near the point of the nose, and it required over 700 tons pressure to pierce the forging, and, in conse-

quence, die liners and piercing shanks broke with appalling rapidity. By adding ⅛ in. to the outside finish of the nose of a shell and 1/16 in. to the inside finish of the nose, the final maximum piercing pressure dropped to below 400 net tons with a well-heated billet or blank. More pressure per square inch of the shank area is required to pierce an 8-in., it is found, than a 9.2-in. forging. Also the pressure required to pierce an 8-in. shell within 12 in. of its full depth, it is stated, is but 500 lb. per sq. in., while the last 12 in. require 1000 lb. or 400 net tons on the forging.

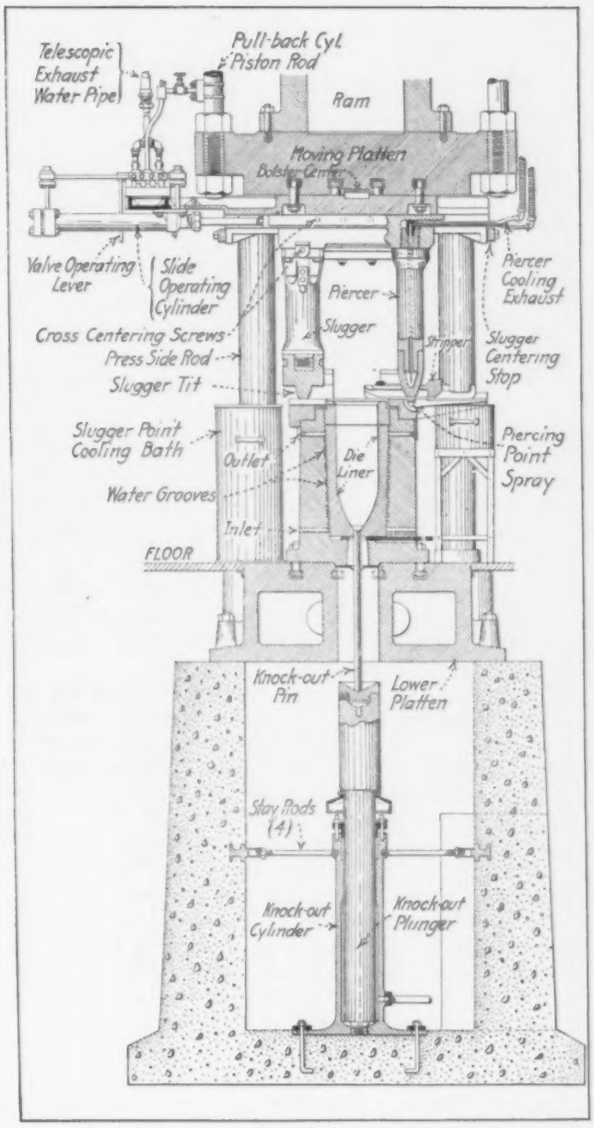
To facilitate piercing by the piercing tool about 1 cu. in. of powdered blacksmith coal is dropped into the center cone after the slug is set down, and this acts as a smoke and tar lubricant for the piercing point. As the point enters the forging dense smoke pours up around the piercing shank and as soon as the forging is removed from the press a large globule of liquid coal tar is discovered at the bottom of the pierced hole. The company advises that coal dust should be used in piercing with great caution and the quantity used must not be excessive. The British Inspection Staff, it says, considers the use of sawdust and fuel oil safer than the use of powdered coal, and if coal is used it must be used with discretion and in full knowledge of the possibility of gas pockets resulting from its use.

The die liner is made from special castings of nickel-chrome semi-steel, heat treated. The metal is the result of experiments, study of photomicrographs and physical tests to get regular results. The liner is tapered and is pressed into the holder with about 500 tons pressure, after which one or more shims, indicated in the drawing, are inserted under it to fill the space between its bottom and the floor of the die holder and so to prevent repeated forging operations from forcing it further into the holder. The average life of a die liner is approximately 1400 forgings, as shown by the records of 500,000 forgings. Some liners have run as high as 3500 forgings, while others have broken after making only one or two forgings.

The comparatively long life of the liners is attributed to four factors: The metal in the liners and its proper heat treatment; the tapered form of liner driven home with 500 tons pressure into a tapered holder, which it fits accurately, subjecting the liner to enormous initial compression, partially or wholly counteracting the great bursting pressure on the liner, due to the forging operation; the proper cooling of the die liner after every forging, so that the effect of heat treatment is not overcome by later overheating, and the use of no greater hydraulic pressure on the press than is necessary to pierce a properly heated ingot in a reasonable time. The cooling of the liner and also of the piercing point is by means of water.

The die holder and the die bolster are made from 0.40 per cent carbon steel castings. The guide ring and slugger nose are of the same material as the die liner. One guide ring outlives four liners. The life of a slugger nose is about 5000 forgings. The slugger shank is a 0.40 per cent carbon-steel casting and the piercing shank is made from nickel-chrome steel forgings of approximately 0.50 per cent carbon. The life of the piercing shank is indeterminate, as some shanks lasted for more than a year, while others were discarded in a few months. The piercing points for 8-in. forgings are made from 0.50 per cent nickel-chrome steel and heat treated to a Shore scleroscope hardness of 50 and 40 at the open end. The average life of these points is about 500 forgings, allowing for reworking those that can be reused after a grinding salvage operation.

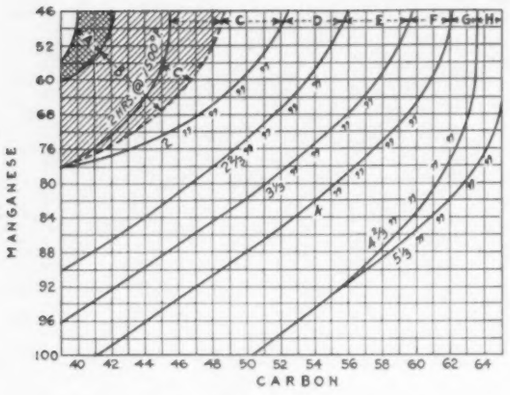
Immediately after being forged the shells are



How Accuracy of Adjustment of Slugger and Piercer Is Obtained May Be Noted from This Sectional Drawing

inspected for eccentricity and, if found eccentric, the press is stopped and the reason for the eccentricity remedied. One of the illustrations shows the method of hot inspection. After being inspected the forging goes to the preliminary cooling chambers shown in the illustrations and are here cooled to below 550 deg. Fahr. previous to heat treatment. The object of these preliminary cooling chambers is to provide a means for cooling the forgings under cover to protect the men in the shop from the intense radiation of heat from a large number of hot forgings, and these chambers have been found very effective in so doing. When forging at a rate of 100 forgings per hour, the men work close to the chambers without serious discomfort from the radiated heat. The chambers allow the forgings to cool in about the same time they would if set out on the floor, but without inconvenience to the men in the shop.

The finishing process in the manufacture of shell forgings is normalizing—that is, reheating the forging and allowing it to cool naturally to bring the steel into the best untempered condition. There are, it appears, three critical zones of temperature which have to be considered in normalizing a shell forging. A lower zone of heat about 600 deg. Fahr., below which the forgings must cool after forging and before normalizing; a middle zone of about 1450 deg. Fahr., at which the grain struc-



Normalizing Chart for Forgings Made from Cast Steel Slugs. Zone A—Temperature held at 1500 deg. F. 2 hr., forging cooled, reheated to 1650 deg. F. and after 10 min. rapidly cooled under cover. Zone B—Temperature held at 1650 deg. F. 10 min., cooled normally on floor. Zone C'—Method of either zone B of C may be used. Zone C and D in proximity to C cooled normally. Zones E, F, G, H, and zone D in proximity to E cooled in chamber as slowly as possible

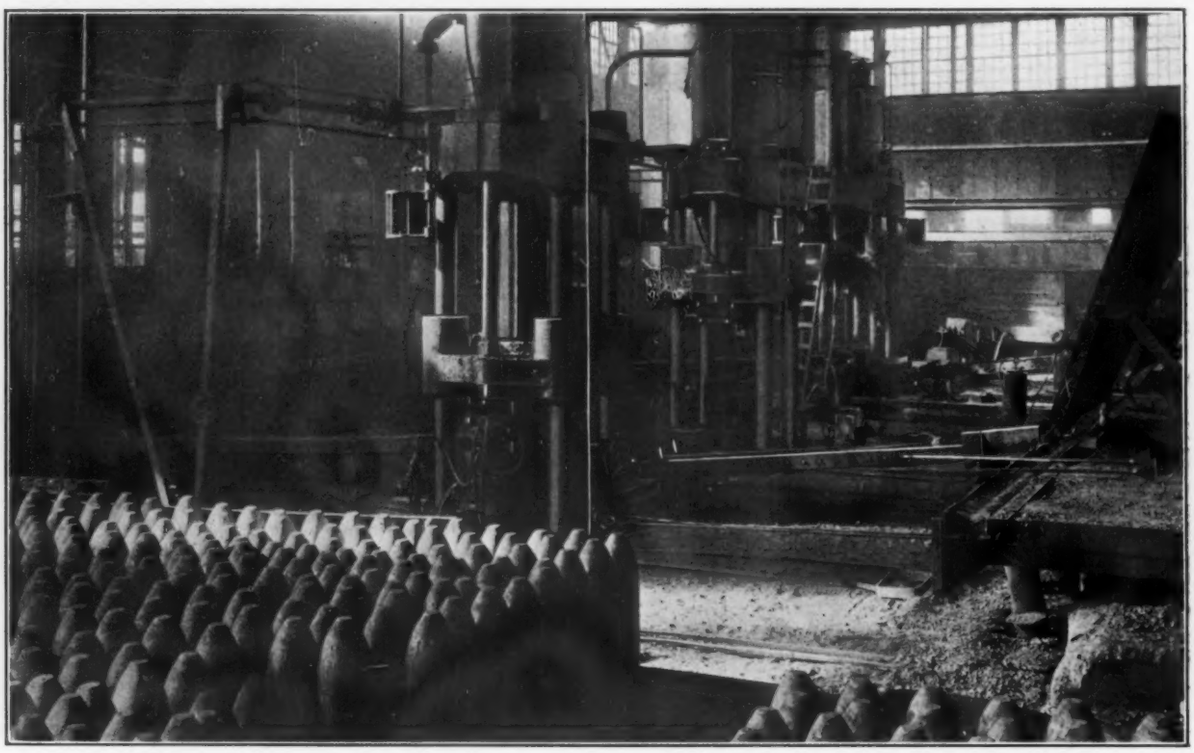
ture of the steel refines if the steel is held at that temperature, and a third zone of about 1650 deg., above which the grain structure enlarges and carbon conditions change.

The exact temperatures of these three heat zones and the time which the steel must be subject to these temperatures vary with the analysis of the steel, and the company has found that the time and temperature factors for bar steel differs from the similar factor for cast steel of identical analysis. Steel with carbon from 0.45 to 0.60 per cent is normalized by rapid heating to 1500 deg. Fahr., holding it at that heat from two to five hours, according to chemical analysis, and then allowing it to cool naturally at a fast or slow rate, according to chemical contents. As most of the steel used comes in the range of carbon of 0.45 to 0.60, the name normalizing has been appropriated to specifically apply to the method used for this range of carbon. Steel with carbon from 0.40 to 0.45 is normalized by rapid heating 1650 deg. Fahr., holding it at that temperature only long enough to be heated through and through and then allowing it to cool naturally at a fast or slow rate, according to the chemical analysis. The name naturalizing has been given to identify the process used for normalizing such low carbon steel.

Normalizing results of course in refining the grain structure of the steel, and increasing considerably the elongation without materially lowering the elastic or ultimate limits. Naturalizing results in considerably increasing the elastic limit of steel, slightly increasing the ultimate strength and slightly decreasing the percentage of elongation. The company believes that with bar steel of proper analysis, that is carbon 0.45 to 0.55, manganese 0.60 to 0.75, and silicon 0.15 to 0.25 per cent, normalizing would be necessary on but very few heats to make the steel meet the standard requirements of physical tests, but that much more regular physical results and much greater ease in machining are obtained by normalizing.

The normalizing furnaces are heated by means of fuel oil. They are of the continuous truck type, a truck load of forgings at 500 to 600 deg. Fahr. being pushed into the furnace each time a truck load of heated forgings is withdrawn. A truck holds 25 8-in. or 9.2-in. forgings. It is of cast steel covered with fire brick and is 4 ft. 4 in. square. The furnaces are long enough to take eleven trucks with a foot to spare at each end when the doors are down. A truck is loaded by means of tongs on a wire rope operated by an air hoist. The intervals of removing trucks vary from a minimum of 12 min. to a maximum of 35 min. for an eleven-truck furnace. These intervals have been determined by experiments for various analyses of steel. The accompanying chart shows the length of time forgings are carried at the normalizing temperature.

The oil burners in the furnace near the entrance end are equipped with combustion chambers and are placed low to heat the forgings up rapidly. The oil burners behind the second truck are placed high and deliver directly into the upper part of the furnace, and but little heat is required to maintain an

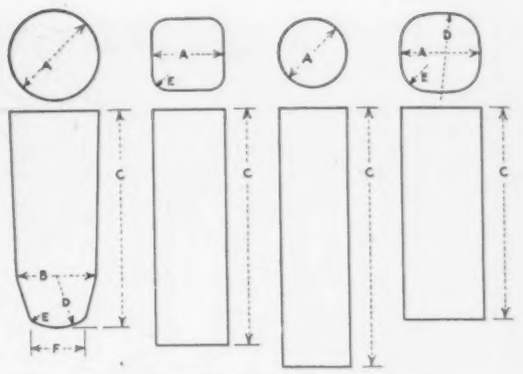


Rollways Transfer Blanks Across Furnace Fronts and Lead from the Furnaces to the Presses

even temperature to the back end of the furnace. The forgings are easily heated in the furnace, it is stated, and the results are regular. A portable pyrometer couple is occasionally used to check the temperature of the forgings and to keep the operators trained as to the proper color of the heated forgings. The temperature must be closely watched and kept within 1450 and 1550 deg. Fahr.

After the truck leaves the furnace it is transferred to the cooling tunnel, where it cools quickly or slowly, according to the chemical analysis of the forgings. The cooling tunnel is the same length as the normalizing furnace and the trucks are pushed through it by means of air hoists, so that a truck in making a full cycle will pass forward through the furnace, across through the cooling tunnel, back through the tunnel for unloading, and is then reloaded for another cycle. The cooling tunnel is brick or concrete, has light doors at each end, small side draft doors at the bottom and three stacks with dampers. In hot summer weather the natural draft of the stacks is augmented when necessary by steam jets in the stacks. High carbon heats are cooled slowly in the tunnels, but low carbon heats are cooled rapidly. The draft in the stacks over the tunnels even with the steam jets on, is but 1/3 oz. per sq. in., and with the steam jets on forgings in the cooling tunnel require a longer time to cool than if set out on the storage floor.

The appearance of the grain of the broken test specimen is a check on the proper normalizing of the heat when compared to the chemical analysis of the steel, and with a little practice it is said that a metallurgical engineer can rapidly learn to handle the normalizing of steel of wide ranges in chemical analysis if he will study at one time the five items he has at hand concerning each heat: First, the chemical analysis; 2, physical test report after first normalizing; 3, the fracture of the broken specimen after normalizing; 4, the record of time in the furnace; 5, the time of cooling of the heat. If the heat falls down on the first normalizing, it can be corrected by a second or rarely by a third normalizing, after studying the results of the first normalizing, unless the steel is out of the possible range of analysis.



Blanks Used in Making Shell Forgings
Sizes for 8-in. shells in inches

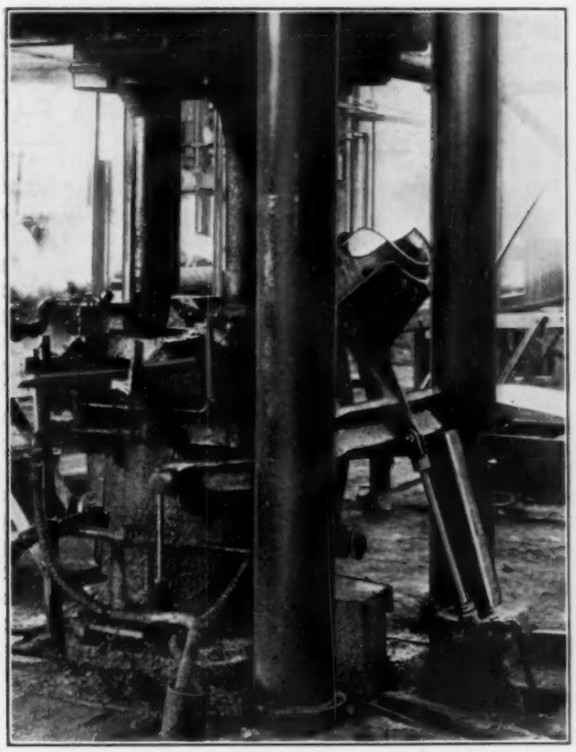
	A	C	D	E
Cast ingot*	8 5/16	20⅜	4 13/16	1¼
Round cornered	6 11/16	19	.....	1½
Round	6¼ to 8	28¼ to 16⅞	.....	.....
Gothic	7¼	18¼	8	2 7/16

Sizes for 9.2-in. shells in inches

	A	C	D	E
Cast ingot*	9 25/64	21⅞	3 11/16	½ &
Round cornered	7 & 7 29/32	25½ & 19½	.....	½ & 1½
Round	8 1/16	23¾	.....	.....
Gothic	8¼	20⅝	10	3 1/16

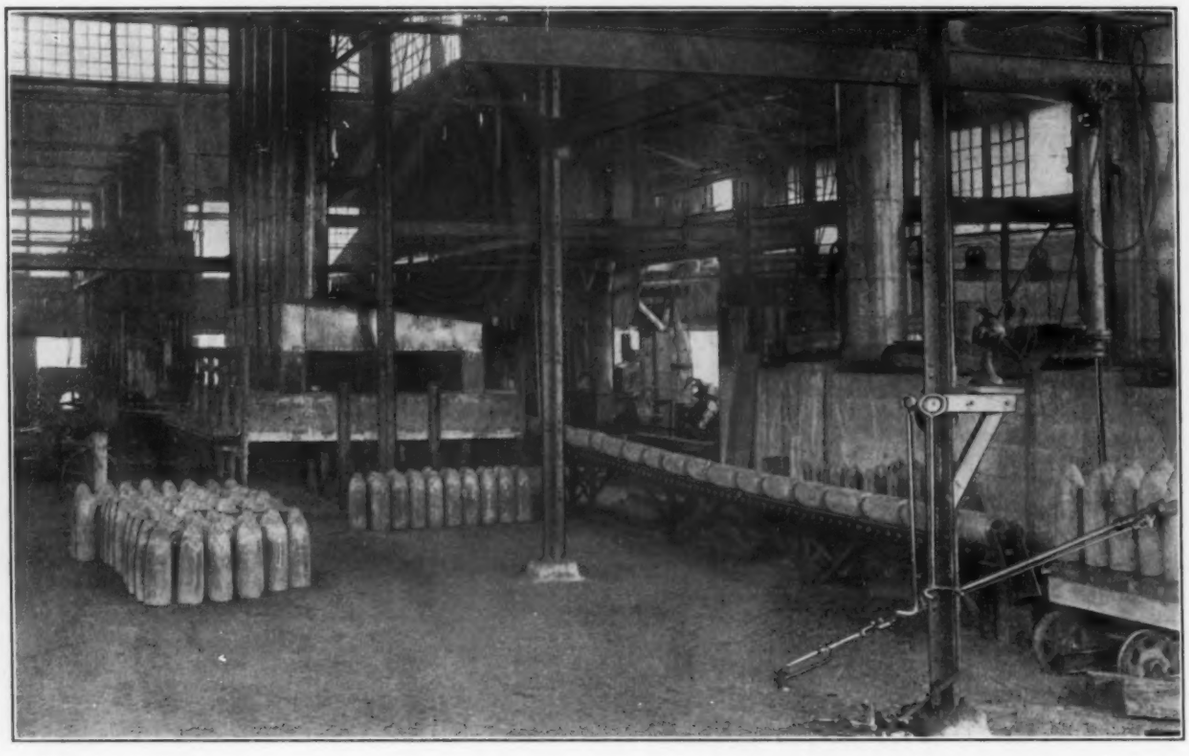
*B for 8-in., 7⅝ in., for 9.2-in., 8½ in.; F for 8-in., 4 15/16 in., for 9.2-in., 6 1/32 in.

The furnaces used for naturalizing are similar to the heating furnaces. They are oil fired, of the same general construction, width and height, and are 20 ft. long inside. The fire brick floor is level and is corrugated with cross-saw tooth ridges to keep the forgings separate as they are rolled through the furnace. The furnaces are continuous, that is, a cold forging is rolled in the receiving end of the furnace each time a hot forging is removed from the discharging end. The cooling trucks are the same lengths as the normalizing trucks, but have only six butts, so the forgings are separated farther on the trucks and therefore cool more rapidly than



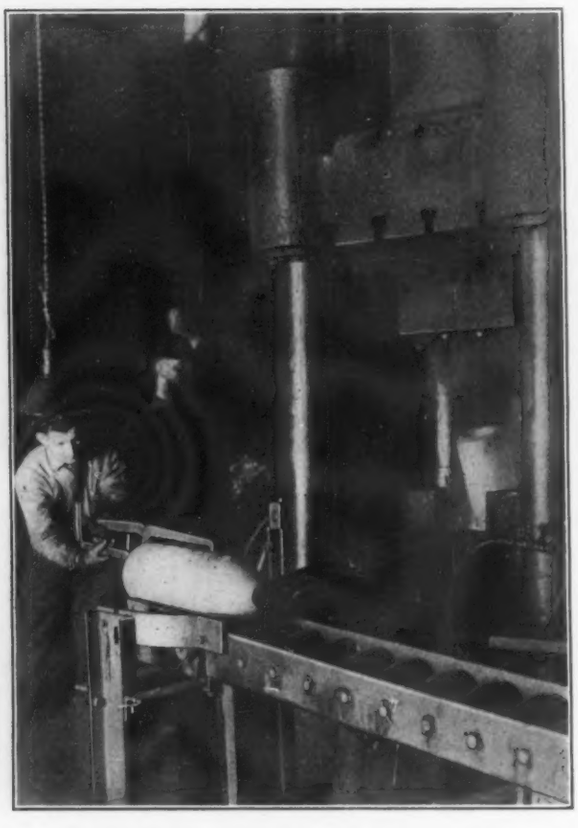
Press Showing Magazine Containing Blank and Its Air Operated Tilting Mechanism

Blank Handled by Tongs and an Overhead Traveler Before the Rollways Were Installed



Preliminary Cooling Chambers and Rollway Leading from Back of Chambers to the Normalizing Trucks

in the normalizing trucks. For slow cooling six forgings are put on a truck and the truck pushed through a cooling tunnel similar to the tunnels used with the normalizing furnace, but for quick cooling only three forgings are placed on a truck, and the forgings cool naturally under a corrugated iron shed without side walls. The capacity of one naturalizing furnace is approximately 30 forgings per hour, or a total of about 600 forgings per day.



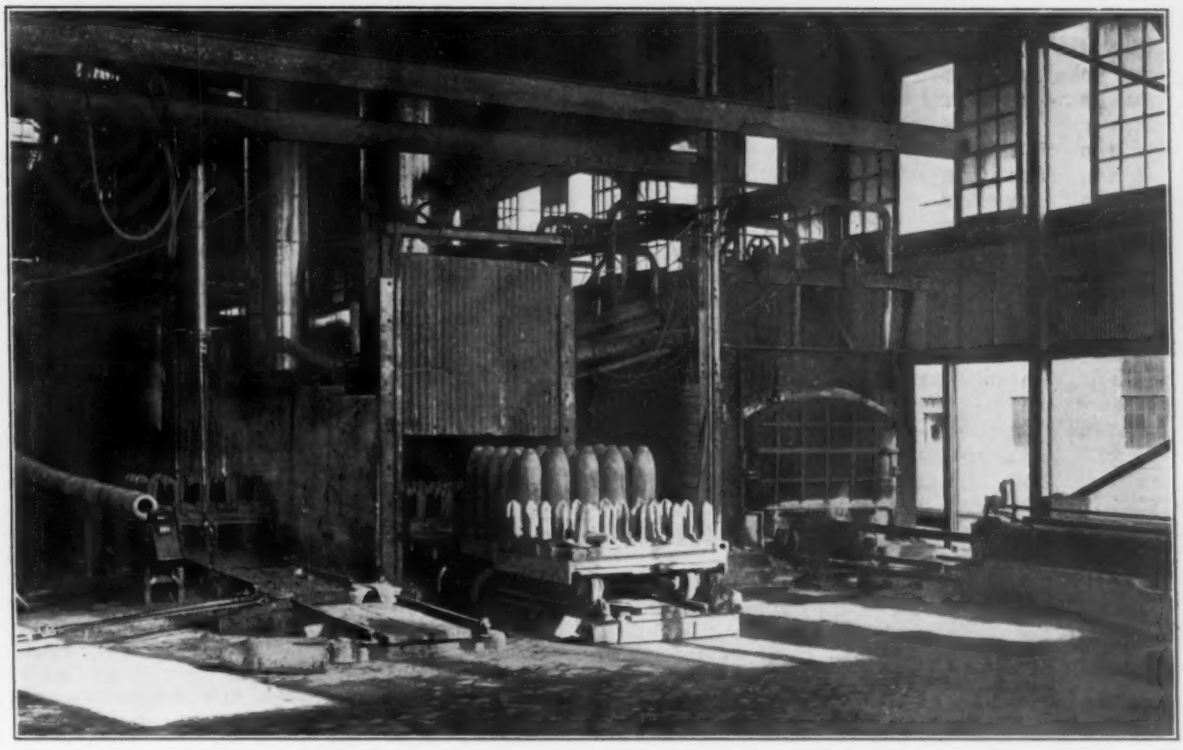
Hot Inspection of Forging on Turntables at Front of Press. Also shows Forging being ejected from Die

As intimated, the naturalizing furnaces are used primarily for steel relatively low in carbon and manganese, but they are also used for retreating heats that have been normalized and have failed on tests because elastic limit or ultimate strength was too low. Such heats can be put through the naturalizing process, cooled naturally at a rate more rapid than the cooling rate of the normalizing process and the elastic limit and ultimate strength raised.

The Curtis Company's records show that many heats of 0.42 to 0.45 carbon which had been normalized and failed in test have been later naturalized and the elastic limit raised 25 per cent, the ultimate strength raised 10 per cent and elongation reduced from 24 per cent in 2 in. to 21 per cent. in 2 in.

The point made is that naturalizing after normalizing retains nearly all the benefits to elongation imparted to the steel by normalizing and adds very materially to the elastic limit and adds moderately to the ultimate strength. If a normalized heat is later naturalized but kept too long at the temperature 1650 deg. or above, the effects of normalizing are counteracted in proportion to the time the steel is carried at the high temperature, so that the steel must be quickly brought up to the desired temperature and only held there long enough to heat through and through. Normalizing after naturalizing entirely eliminates the effect of naturalizing.

Curtis & Co. Mfg. Co. has had in operation presses designed according to the Steedman patent since February, 1916, when their first contract for 150,000 forgings was started. Since that time they have made and shipped 560,000 8-in. and 9.2-in. shells, which by the variety in shapes of blanks used show the flexibility of their process of manufacture. The first forgings were made from Gothic rolled blooms of basic open-hearth steel which were sawed into short blanks of 241 lb. each for an 8-in. forging. About 12,000 tons of this steel were used. Later the company resorted to the use of 8-in. round forged bars of basic open-hearth steel. These bars



Normalizing Furnace and Cooling Tunnel of No. 1 Forge Plant Showing Air Ram for Charging Trucks

were forged under a hydraulic hammer, and sawed into blanks of 245 lb. weight. About 9000 tons were used.

When the steel market became oversold in the spring of 1916 and the company could not obtain an adequate supply of rolled or forged bars for prospective orders, it turned to individual cast steel ingots, and these individual cast ingots are now its main and regular source of steel supply. On account of the foundry's inability to break off accurately the discard from these ingots, the average weight for an 8-in. cast ingot is specified as 250 lb., and for a cast ingot for a 9.2-in. forging 358 lb. The above weight of blanks, it is said, can be maintained low because of the greater accuracy of forgings possible by its method, which, however, requires the greatest of care in heating and in maintenance of equipment if the results are to be duplicated.

When it became necessary to resort to the use of individual cast ingots, the company undertook an investigation to compare forgings from rolled steel with those made from cast ingots, which of course have not had the work done on them that rolled steel has. This led to the following conclusions:

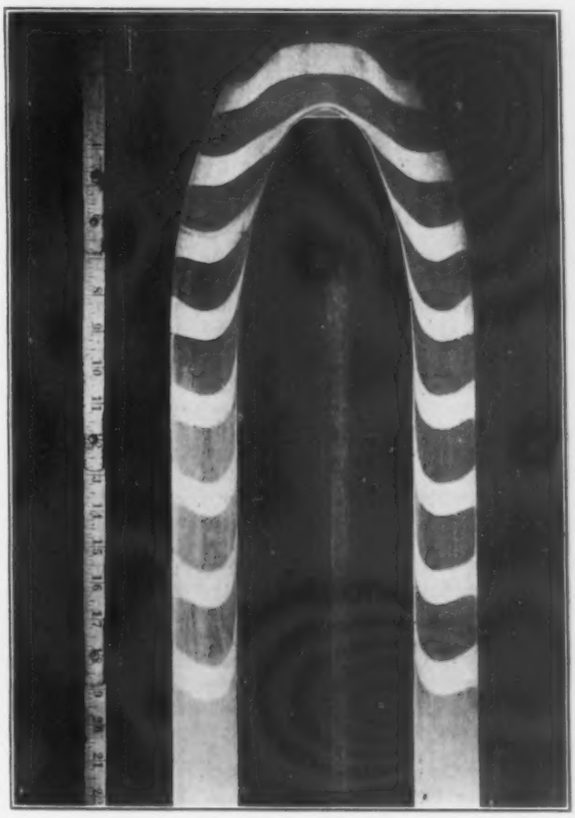
Compressed slugs not normalized compared favorably with rolled bars not normalized.

Compressed slugs normalized compared favorably with rolled bars normalized.

Forgings made from compressed individual cast ingots as normalized are equally as good as forgings made from rolled steel.

The company's present opinion is that forgings made from steel of equal analysis, whether from forged bars or individual cast ingots, if normalized, will give equal results on physical tests but that normalizing is essential to all forgings made from individual cast steel ingots. In its experience with about an equal number of forgings made from bar stock and from individual cast ingots, the percentage of rejections due to defective steel have been considerably less with cast ingots than with forged or rolled bars. A further advantage in favor of cast ingots, if properly made, is that the forgings from individual ingots are free from pipes and seams due to the extension by rolling of small defects in the original large ingots from which the rolled bars are made. It has discovered many rolled blanks with secondary piping, but has not found any of the small individual cast ingots with a trace of secondary piping.

For the purpose of studying the flow of metal in a forging due to the piercing process, a cast ingot was drilled through and through horizontally



Flow of Metal in Forged Shell Due to Piercing. Zebra-like lines are the Norway-iron bars

with a series of parallel horizontal holes ¾ in. in diameter and Norway iron bars were driven into the holes and riveted in place. The special ingot was then forged in the usual manner, after which it was split, polished and acid-etched. The Norway iron inserts showed up in zebra-like streaks, as here shown, indicating a comparatively small area of distortion or local flow. The weld between the Norway iron and the steel was perfect except near the outer surface, though the blank was not heated to an ordinary welding temperature.

Another experiment was made to study the probable results of accidentally forging piped ingots. A 6.4-in. diameter ingot had a ⅜-in. hole drilled axially from end to end. A ¼-in. Norway iron bar shorter than the blank was put in this hole and the two ends were then plugged up lightly with iron plugs. As the rod was ⅛ in. smaller in diameter than the hole, and the two ends of the hole were plugged, this blank was then somewhat similar to a blank with a secondary pipe, which did not show at the fractured end. The prepared blank was forged in the usual manner and the entire length of the forging was cut into horizontal sections. On the main body part of the forging no trace of the hole or the Norway iron bar could be discovered, even with the microscope after the sections were etched, and no trace of the bar or hole was discovered until a section was reached 1½ in. from the bottom of the pierced hole. The Norway iron bar was everywhere thoroughly welded to the steel, and no trace of the void or hole discovered anywhere.

DEFECTS IN STEEL INGOTS

Hot Tops Necessary Precautions—Relation Between Folds and Splits or Canties

"STEEL Ingot Defects" were discussed by J. N. Kilby before the spring meeting of the Iron and Steel Institute in London, May 3, 1917. His paper was supplementary to one that he presented at the Institute's meeting last September, an abstract of which appeared in THE IRON AGE, Oct. 12, 1916. In the present paper Mr. Kilby confined himself to the causes of certain defects in steel ingots of three tons and less. An abstract of his paper follows:

Except with special steels the use of a refractory feeder head or hot top has not been widely adopted, but that it is necessary to produce the maximum of sound steel is beyond dispute. The type of feeder head does not matter a great deal, so far as reducing pipe is concerned, provided it is of sufficient capacity adequately to fill the chill portion. Cost of production seems the real reason why such heads are not more generally used, it being supposed that the extra cost entailed is not more than covered by the saving of steel.

Savings from Use of Hot Tops

Actual works costs, based on piping steels of 0.45 per cent, carbon, show that ingots without feeder heads yield 65 per cent sound, 15 per cent doubtful, and 20 per cent scrap, whereas with feeder heads 90 per cent is sound and 10 per cent scrap. A 15-cwt. ingot would yield 1.5 cwt. more sound steel with head at a cost of 1s.; 30-cwt. ingot 3 cwt. more at a cost of 1s. 4d., and a 50-cwt. 5 cwt. more at a cost of 1s. 8d. Apart from increased yield and more reliable steel, there is the great saving in the ultimate manipulation of the ingot in the rolling mills, and it would thus appear that feeder heads are economically essential even for what are termed "ordinary" steels.

Effect of Occluded Slags

The presence in ordinary carbon steels of finely divided or emulsified solution of slag is as undesirable as in the case of special steels, though it is not so liable to influence the ordinary physical tests called for in these steels. There are two sources of "oxides" in the steel. They may be formed during the melting of the charge and not subsequently removed, and they may be introduced by excessive or erratic feeding of ore.

The first essential in acid open-hearth steel manufacture should be correct and consistent conditions at the melted stage. The two important factors up to the melted stage are quick melting and correct state of slag and bath at melting. A 2 per cent silicon basis is a good one to work to; in other words, the whole charge should have an available silicon charge of 2 per cent, taking the silicon in the pig iron and making up the difference by adding slag with the charge. The use of slag in the charge greatly reduces the amount of oxidation and gives more reliable bath conditions.

Folds from Bottom-Cast Steel

Bottom-cast steel poured at too low a temperature or too slow a speed tends to cause "lappiness" or "folds" in the ingot. Ordinary carbon steels do not suffer much from this condition, since if the steel is so cool as to "lap" badly the chances are much against the ingots filling; but chrome steels and high silicon steels (the latter up to 2.50 per cent of silicon) are always liable to lapping in a greater or less degree. Some steel makers think that the lapped portion of the steel becomes coated with the film of oxide which is embedded in the ingot by the flow of steel over it, and that this forms the beginning of a flaw in the rolled bar, taking the form of a crack or split after the bar has been subjected to pickling. But, in the author's opinion, a cavity or split in a rolled or forged bar has no relationship whatever with lapping in the ingot.

The use of comparatively large nozzles in the ladle and the small number of ingots per bed lead to spasmodic teeming; the stream from the ladle running at full force being of greater volume than is compatible with correct filling of the molds. The teemer then has to endeavor so to control the stream as to fill the molds correctly, and what is obtained is an ingot teemed at various speeds and in a good many places. The stream being momentarily cut off, trouble might be expected from such teeming and wrongly attributed to the steel having a habit of lapping.

Erosion of Runner Brick

In bottom-cast steel the flow of the metal in contact with the fire clay trumpet pipe and runner bricks causes erosion, the product of which is carried along into the ingot. The tendency of this "slag" on entering the mold is to rise to the surface and toward the sides of the ingot, but the flow of the steel carries it to its final position, and since the steel in the immediate vicinity of the mold begins to solidify on contact, the fluxed runner brick has little opportunity to reach the actual face of the ingot and become merely a surface deposit.

Apart from material actually fluxed by the flow of the steel, the jointing used in the trumpet and runner brick joints is washed off in fairly large pieces, often too large to become fused. The position taken up by these pieces of "dirt" is similar to that of a fluxed runner. Extraneous matter such as fireclay jointing may be largely eliminated by using a suction ejector down each mold and a trumpet pipe immediately before casting.

Manganese Ore Imports

Manganese ore imports into the United States in April, according to official data recently made public, were only 27,023 gross tons, the smallest in many months. This brings the total to May 1, 1917, to 172,743 tons or at the rate of 43,186 tons per month. The March imports were 56,394 tons and the monthly import rate in 1916 was 48,026 tons.

The Phoenix Mfg. Co., Cleveland, has removed its offices from 1430 West Sixth Street to larger quarters at 913-15 Engineers Building, in that city.

Automatic Press with Multiple Plungers

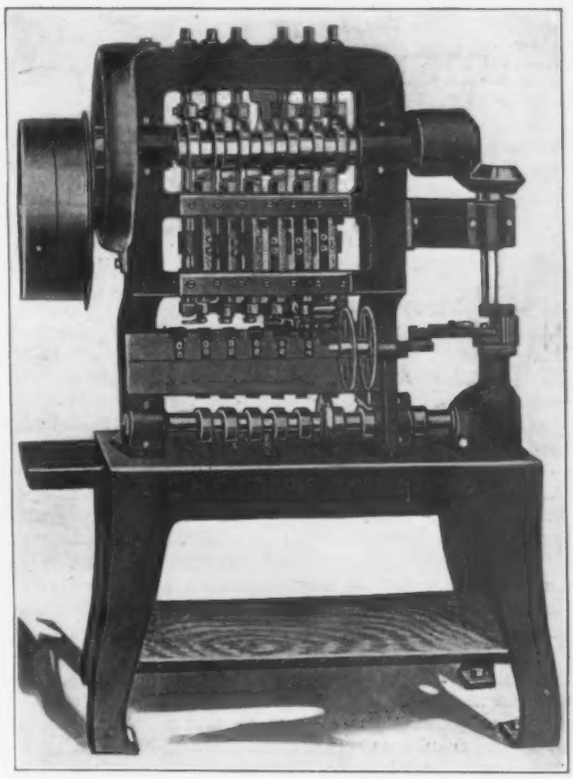
An improved form of automatic press of the multiple plunger type has been placed on the market by the H. E. Harris Engineering Co., Bridgeport, Conn. It is designed for the production of stamped, perforated and embossed sheet metal parts such as eyelets, snap fasteners, primers, percussion caps, thimbles, ferrules, automobile grease and oil cups, fuse caps, boxes and jar covers. The press is automatic in operation and will, after the blank is cut, carry the work along until the part is completed without any handling by the workman. This type of press, which is commonly known as the eyelet machine, has been in use for some time. In the new machine the frame is offset at the left end and provision is made for an extra die and a double punch to be carried by the last plunger, thus enabling the press to perform one more operation than the number of plungers. This arrangement, it is emphasized, is a special feature of the machine and enables an extra operation that might not have been thought of at the time of purchase to be performed. Another point upon which emphasis is laid is that all of the operations are simultaneous, each one of the plungers performing an operation on the parts which are going through the press at each revolution of the camshaft.

The press consists of a heavy main frame carrying a number of press plungers operated by a camshaft which rotates at rates varying from 65 to 150 r.p.m., according to the nature of the work being handled. This shaft determines the time and throw of the plungers which carry the different punches for stamping, embossing, piercing, drawing, etc. Dies designed to suit the different punches are held in the bolster fitted on the bottom part of the main frame, which also carries the transfer slide.

After the punches have operated the plungers are returned to their upper position by another set of cams on the same shaft. This movement is secured by the adjustable horizontal members above the camshaft, which is connected to the plungers by vertical lifting rods at the back of the press. The camshaft is connected through gearing to the vertical crankshaft which operates the transfer slide from right to left. The function of this slide is to carry the work along from one plunger to the other and locate a piece under each plunger before every stroke of the press is made. A roll feed on the back of the press passes the stock from a reel at the front of the machine under the first plunger, where a blank is punched out for the first operation. The size of the machine is determined by the depth of the parts to be drawn or embossed, together with the diameter or width of the blank. From three to 12 plungers are regularly supplied, although the presses most generally used have from four to seven. The weight of the machine and the throw of the cam and other details are arranged to suit the parts that are to be manufactured.

In operation the stock, which is in the form of a coiled strip, is placed on the reel at the front of the machine and passes through a lubricating pad and stripper over the blanking die to the feed roll mechanism in the back. An intermittent ratchet timed to co-ordinate with the movement of the press plunger operates the feed mechanism. While the stock is in this position the first plunger blanks out a piece and carries it through the die to a pocket in the transfer slide, the scrap stock being coiled on a reel at the back of the press after it leaves the feed rolls. The vertical crankshaft moves the transfer slide to the left through a distance equal to the center distances between the plungers, this action carrying the blanked piece in the pocket under the second plunger.

The forming punch which is carried by the second plunger descends and draws the blanked piece through the transfer slide into the first forming die. The transfer slide then moves to the right and assumes its original position. The next movement of the slide from right to left carries the cupped piece from the second position to the third, while a fresh blank is brought from the first plunger to the second. A set of vertical ejector plungers operated by the lower crankshaft returns the work from the die into the fingers of the transfer slide. These take hold of the piece in practically the same way as the thumb and index finger of the human hand and serve to hold the part while it is being transferred for the succeeding operation. This operation is repeated at each stroke of the press, until the work has been carried along to the last plunger, when it is ejected and carried through a tube into a box or pan, provided to receive the finished parts. Miter gears on the two camshafts and the vertical crankshaft provide for synchronous operation of the upper and lower camshafts. The machine is entirely automatic in operation, all the attention required being to keep the stock reel full and to remove the boxes of finished work and any small piercings.



An Automatic Multiple Plunger Press Capable of Turning Out Between 3500 and 8000 Small Sheet Metal Parts in 1 Hr.

The output of the press varies from 35,000 to 80,000 parts per 10-hr. day, this large variation covering all classes of work. These figures, it is stated, allow time for repairs, setting up the press, sharpening tools, oiling, replenishing the stock and other legitimate stoppages. The output, of course, depends upon the kind of material used, its thickness, the depth to which it has to be drawn and other factors due to the nature of the work.

The Gschwind Furnace Company of Youngstown, Ohio, and the Star Iron Works of Gowanda, N. Y., have merged, and the name of the new organization is the Star Iron Works Company, Inc., Gowanda, N. Y. Plant, foundry, machine shop and main office are at Gowanda and a branch office at 15 Wick Avenue, Youngstown. Furnaces and supplies for the warm air furnace trade will be manufactured at the Gowanda plant. A general foundry and machine shop will also be operated. Previous to the merger the Gschwind company was buying its castings, but growth of the business necessitated arrangements whereby it could have a foundry of its own. The following are officers of the new company: Carl E. Gschwind, Youngstown, president; W. W. Watson, Youngstown, vice-president, and D. H. Foster, Gowanda, secretary, treasurer and general manager. These officers, with Edward Foster and Robert Congdon, constitute the board of directors.

American Society for Testing Materials

Specifications Drawn Up for Carbon Tool Steel and Railroad Malleable Iron Castings—Standards for Photomicrographs—Practicable Magnetic Testing

NOTABLE contributions to the progress of the iron and steel industry were made in the past year by the American Society for Testing Materials, judging from the annual meeting held last week at Atlantic City, N. J. In spite of the demands growing out of the war, some fresh specification writing had been achieved out of the committee conferences of producers and consumers, and a portentous step in testing developments was announced in a paper on the magnetic method of testing a material without requiring a specimen selected to be representative. The registration was surprisingly large and the attendance at sessions unusually well sustained, a fact commented on as indicating the especially serious consideration which is given to the society's work.

The report of the first day's sessions, Tuesday, June 26, covering some of the main iron and steel matters, was made in last week's issue. This included a review of the work of the committees on wrought iron, cast iron, micrograph making and methods of testing, and of the report of the executive committee and the address of the president. As regards the magnification scales for micrographs, it may be added that George F. Comstock, Titanium Alloy Mfg. Co., Niagara Falls, N. Y., in a written communication, questioned that there should be separate standards for ferrous and non-ferrous metals and emphasized that 75 diameters though possibly applicable to rolled non-ferrous material was not satisfactory for cast non-ferrous material. He also had objection to the scale of magnifications reported, as the scales obtainable with his apparatus, of 20, 50, 100, 200, 400, etc., modified to suit the proposed standard of 50, 100, 250 or 500, would in some cases result in loss of definition or in others unnecessarily limit the field photographed.

In the matter of the railroad malleable iron castings specifications, mentioned in last week's account, Stanley G. Fagg, Jr., explained that owing to the different requirements which malleable iron had to meet, the classification as railroad malleable iron was regarded as needed and the name was selected for the want of a better one. Some manufacturers as of driving chain demanded stiffness so as not to destroy the pitch of the chain and automobile makers desired a relatively soft material. J. H. Gibboney, Norfolk & Western Railroad, Roanoke, Va., added that a number of railroads have had to put into the malleable iron specifications of the society the improvements covered by the new standard.

In his presidential address, A. A. Stevenson, in addition to the passages referred to in the preceding issue, touched on the movement for international specifications. "Those of us who have kept in touch with the progress, or lack of progress, in so far as international specifications are concerned," he said, " have realized how hopeless the task has seemed. The different conditions existing in the several countries and the apparent feeling in some countries that international specifications would militate against their export trade, seem to be the two main difficulties in the way. In fact, universal international specifications would appear to be somewhat of an iridescent dream, although I feel we should continue our efforts in this direction."

Revising Specifications

In respect to the changing of specifications, he spoke in part as follows: As we gain more knowledge of materials and as new methods of testing are developed, there will be less necessity for a number of requirements that are now in our specifications, and as a consequence the specifications will be much shortened, though just as efficient. As better grades of raw material become exhausted, there is no doubt that changes in the requirements as to impurities will have to be given consideration. Personally I feel that time will show that many specifications have requirements covering impurities that are not necessary, and that materials with these requirements raised will be just as reliable as materials furnished under present specifications. Some of the recent literature indicates that the countries now at war, both the Allies and Central Powers, have found that to be true. In discussing the question of copper in steel with a British officer not long ago, I was told that the Germans had presented them with some shells running as high as 1½ per cent in copper.

Observations on Tensile and Other Tests

The recommended speeds for pulling tensile tests brought out some discussion from which it developed that the U. S. Bureau of Standards and the Baldwin Locomotive Works had made series of tests which had been a guide to the selection of the committee's table of proper speeds and these test results are to be supplied to the membership to indicate, for example, the differences of average results at different speeds.

An interesting observation on the progress report of the committee on corrosion of iron and steel was made by R. B. Carnahan, Jr., second vice-president American Rolling Mill Co., Middletown, Ohio, who deplored the lack of a real measure of corrosion. A metal roof is removed, he remarked, because of holes, though many parts show no corrosion at all. To describe corrosion in terms of a loss of weight in an accelerated test is fallacious. The failure of a steel plate in spots may be due, he held, to flaws resulting from steel cast in a dirty or moist mold, from some malpractice in the soaking pit, from seams produced in rolling; and many of these mill influences may be worse than chemical shortcomings.

The report of the committee on steel, A-1, was made at the session of Wednesday morning, June 27, and the paper on "Some Applications of Magnetic Analysis to the Study of Steel Products," by Dr. C. W. Burrows was presented at the same session together with a group of papers on the rôle of different alloying elements in alloy steels, such as nickel, vanadium, etc. It is planned to review Dr. Burrows' paper in a later issue together with the discussion, which was participated in by Dr. J. C. Unger, Carnegie Steel Co., Ralph P. Devries, Dr. Henry M. Howe and others. Also a study of the alloy steel papers will be carried over to a later issue; these were presented by the following authors: Dr. Howe, on manganese; Robert R. Abbott, metallurgical engineer, Peerless Motor Car Co., Cleveland, on nickel; Dr. W. E. Ruder, Schenectady, N. Y., on silicon; G. L. Norris, engineer of tests, American Vanadium Co., Pittsburgh, on vanadium, and F. J. Griffiths, second vice-president and general superintendent, Central Steel Co., Massillon, Ohio, on chrome vanadium. In connection with the steel committee's report, the review of which follows, it was announced that Chairman C. D. Young has resigned because changes in duties compelled him to do so.

Report of Committee on Steel

The committee on steel, A-1, submitted one new specification, to be published as tentative for one year under the present regulations before it is put to a mail vote of the membership; it revised two tentative specifications with a recommendation that these tentative

standards should be continued as such for another year; it revised ten existing standards, which revisions will stand in abeyance under the rules for one year, and it recommended that four other tentative specifications should be continued as tentative. Thus a carbon tool steel specification represents the fresh specification writing in steel lines this year, the work of a new sub-committee, and none of the six new specifications submitted last year were regarded as ready for final presentation to the membership, although, as noted above, in only two were revisions made, those for steel tie plates and for boiler and firebox steel. The specification for tie plates was thoroughly revamped, but met with considerable adverse discussion in the meeting, though in its new form still tentative, and some adverse criticisms were leveled at the carbon tool steel specification. A new sub-committee has been added to A-1 this on deep drawing steel stock, making in all eighteen sub-committees. On steel castings, the committee reported it as "undesirable at the present time" to prepare specifications for alloy steel castings.

Carbon Tool Steel Specifications

The tool steel specification divides the steels into three grades, as noted on the accompanying table showing the chemical composition of the grades. It is stipulated that the steel shall be made by the crucible or electric process, with the exception of grade C, which may be made with the open-hearth process.

Elements Considered.		Grade A.	Grade B.	Grade C.
Carbon, per cent.	Class No.			
	1	0.45 - 0.60	(Same as Grade A.)	(Same as Grade A.)
	2	0.60 - 0.75		
	3	0.75 - 0.90		
	4	0.90 - 1.05		
	5	1.05 - 1.20		
	6	1.20 - 1.35		
	7	1.35 - 1.50		
	8	1.50 - 1.65		
	9	1.65 - 1.80		
	10	1.80 - 1.95		
Manganese, max., per cent.		0.40	0.45	0.60
Phosphorus, max., per cent.		0.02	0.025	0.035
Sulfur, max., per cent.		0.02	0.035	0.04
Silicon, max., per cent.		0.35	0.35	0.25

Carbon Tool Steel Graded According to Chemical Composition

In the active discussion which this part of the report developed much was said against the stipulation of a chemical qualification only for the tool steel. Complaint was made of the considerable amount of segregated steel which had been obtained in the last few months, and N. B. Hoffman, Pittsburgh, pointed out how with the so-called melting bar, steel could be obtained in the crucible process of materials not nearly so expensive as steel based on muck iron, which gave a much better tool, against material in which the phosphorus and sulphur have been reduced in the open-hearth furnace. J. M. Darke, General Electric Co., Lynn, Mass., admitted the inability of determining quantitatively excessive segregation, but intimated that if the specifications covered the matter of oxides, the point might be met in part. He explained that in his company's specifications there is a clause providing that slag or oxide material be determined microscopically. Considerable stress was also laid on the fact that it makes little difference relatively what are the chemical constituents of tool steel, as no control is exercised over the heat-treating. From a situation in which it seemed that the specification would not meet the approval of the meeting, even to the extent of having it supported as a tentative standard, it was finally accepted as tentative after some closing remarks made, for example, by Guilliaem Aertsen, Midvale Steel Co., Philadelphia, who called attention to the fact that the specification was merely one covering bar steel for tools and was not one on heat treatment of the bars; by Dr. Henry M. Howe, who said, "We have got to crawl before we can walk. The standard is one which may be elaborated as time goes on"; and by S. S. Voorhees, Bureau of Standards, Washington, who observed that the specification covers the raw material which will produce certain results under proper treatment.

Steel Tie Plates

The revision of the tentative specifications for steel tie plates now allows for the use of Bessemer as well as open-hearth steel. A sliding scale of percentage of elongation has been adopted for both the 2-in. and 8-in. test specimens, being 1,500,000 ÷ tensile strength, but not less than 18 per cent, for the 2-in. specimen; and 1,400,000 ÷ tensile strength, but not less than 16 per cent, for the 8-in. specimen. The limit for tensile strength of material of ⅝ in. in thickness has been omitted. A reduction in area of 25 per cent is stipulated as a substitution for the bend test, now omitted. Provision has also been made for the purchase of tie plates according to following minimum carbon content: corresponding to 64,000 lb. tensile strength, 0.12 per cent carbon for Bessemer steel and 0.20 for open-hearth steel, and corresponding to 55,000 lb. tensile strength, a minimum carbon of 0.08 for Bessemer and 0.15 for open-hearth steel.

Capt. Robert W. Hunt interposed strenuous objection to the tentative acceptance of the tie plate specification, regarding it as unfortunate that such a standard should go before the world, as it is, he claimed, altogether impracticable. The limit of variations is contrary to practice, he said, and as munitions class of steel was being adapted to tie plates, he held that the limitation of the physical tests is not required. F. E. Abbott, Lackawanna Steel Co., Buffalo, said the specifications called for more testing than the user cares for. Partly because it became clear that a considerable amount of time had been paid to the subject in committee and that the chief objector in committee was willing that the specification be set up as tentative, it was voted to adopt the recommendation of the committee.

General Rail Matters

On the general rail situation the committee report reviewed the publications of the Interstate Commerce Commission and the American Railway Engineering Association, including the indication of the annual reports of rail failures, which show a decreasing tendency in number per 100 miles of track of rails rolled in recent years.

An investigation has been conducted by the Pennsylvania Railroad System to develop the possibilities of a quick bend test as an alternate or substitute for the present drop test. The results obtained on an experimental machine at Altoona have shown such encouraging results that a special machine has been designed and will be used in the near future at the different rail mills to obtain definite comparative data of physical properties indicated by this machine and the regular drop test.

The committee reports a decided tendency toward the use of heavier rail sections. Rails up to 130 lb. per yard have been ordered by one of the leading railroads in considerable quantities. The rail committee of the American Railway Engineering Association has finally adopted standard sections for rails over 100 lb. per yard.

Billets for Forgings

To cover alloy-steel forgings an addition was made to the specifications for blooms, billets and slabs for carbon-steel forgings. This stipulates the chemical requirements, and groups according to the carbon content into seven classes, with the proportions of the other elements as given in the accompanying table. The carbon ranges are as follows: 0.10-0.20; 0.15-0.25; 0.20-0.30; 0.25-0.38; 0.30-0.43; 0.35-0.50, and 0.45-0.60 per cent.

The carbon ranges for carbon-steel forging billets have been changed, as immediately subjoined, and the manganese is to range from 0.50 to 0.80 per cent for all the carbon ranges, with emphasis on this note that: "When the steel is to be used for case-hardening purposes, the manganese should be specified not to exceed 0.50 per cent. When the minimum carbon specified is

Other Elements Than Carbon in Billets for Alloy Steel Forgings

Elements Considered	Nickel Steel	Chrome-Nickel Steel: 1.00–1.50 Per Cent Ni.	Chrome-Nickel Steel: 1.50–2.00 Per Cent Ni.	Chrome-Nickel Steel: 2.75–3.25 Per Cent Ni.	Chrome-Nickel Steel: 3.00 Min. Per Cent Ni.	Chrome-Steel	Chrome-Vanadium Steel
Manganese, per cent	0.50–0.80	0.50–0.80*	0.30–0.60	0.45–0.75*	0.30–0.60	0.30–0.60	0.50–0.80*
Phosphorus, max., per cent	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Sulfur, max, per cent	0.045	0.045	0.045	0.045	0.045	0.045	0.045
Nickel, per cent	not under 3.00	1.00–1.50	1.50–2.00	2.75–3.25	not under 3.00	....	....
Chromium, per cent	....	0.45–0.75	0.90–1.25	0.60–0.95	not under 1.00	0.60–0.90	0.80–1.10
Vanadium, min., per cent	....	....	....	....	....	....	0.15.

*When the steel is to be used for case-hardening purposes, the manganese should be specified not to exceed 0.50 per cent. When the minimum carbon specified is 0.35 per cent or over, the manganese range may be specified 0.30-0.60 per cent.

0.35 per cent or over, the manganese range may be specified 0.30-0.60 per cent." The carbon ranges are 0.05-0.15; 0.15-0.25; 0.20-0.30; 0.25-0.40; 0.30-0.45; 0.35-0.50; 0.40-0.55, and 0.45-0.60 per cent.

In the matter of specifications for alloy-steel forgings themselves, the committee has withdrawn its table in last year's specifications covering chemical composition for certain type of machinery forgings, as it "feels that it is undesirable at present to attempt to correlate the chemical and physical properties of these forgings. Moreover, the recommended chemical compositions for blooms, billets and slabs for alloy-steel forgings previously referred to will meet the requirements."

In revision of the locomotive and car axle forgings specifications, some changes were noted in impact proof testing over the methods appended to the 1916 standards. For tests under the specifications for carbon steel axles, a 2-in. test piece is favored for the larger axles as against the drop test.

Steel Tubing and Pipes

In the revision of boiler tubes specifications a change is made in the flange test to express the size of the flange as a percentage of the outside diameter of the tube, with a maximum limit, instead of as a fixed dimension of sizes between certain limits, thus: "For all tubes under 6 in. in diameter and having a thickness less than 9 per cent of the outside diameter, a test specimen shall have a flange turned over at right angles to the body of the tube without showing cracks or flaws. This flange, as measured from the outside diameter of the top, shall not be less than 15 per cent of the outside diameter (10 per cent for wrought iron), but the flange shall in no case exceed ½ in. in width."

The revision of the requirements for the flattening test is to bring this test into agreement with that of the American Society of Mechanical Engineers, the Master Mechanics' Association and the Master Car Builders' Association, and the Birmingham wire gage has been recommended as standard, which involves slight changes in the table of standard weights.

In the case of tubes for stationary boilers, a formula is given for determining the test pressure when the pressures specified give a fiber stress greater than 16,000 lb. per sq. in. This is

$$P = \frac{32{,}000t}{D}$$

in which P = the pressure in pounds per square inch, t = the thickness of wall in inches, and D = the inside of tube in inches.

The manganese requirement of boiler tubes has been changed from 0.30 to 0.50 per cent to 0.30 to 0.60 per cent.

In marking it is specified now that the pressure in pounds at which the tube was tested must be stenciled on each tube.

A change in the pipe specifications reduces the tensile requirement for wrought iron pipe from 45,000 to 40,000 lb. per sq. in. Revisions in the flattening test for steel pipe provide for harmonizing the A. S. T. M. requirements with those of the Master Mechanics' and Master Car Builders' associations. They stipulate that: "For sizes over 2 in. in diameter, a section of lap-welded steel pipe 6 in. long shall be flattened until the distance between the plates is one-third the outside diameter of the pipe with the weld located 45 deg. from the line of direction of the applied force, without developing cracks.

"For sizes over 2 in. in diameter, a section of butt-welded steel pipe 6 in. long shall be flattened until the distance between the plates is one-half the outside diameter of the pipe with the weld located 45 deg. from the line of direction of the applied force, without developing cracks."

In the bend test for steel pipe it is now required that 2-in. or smaller pipe must stand bending cold through 90 deg. against 180 deg. under the former specification, but around a mandrel of 15 pipe diameters against 18.

Automobile Steels

As regards the automobile steel specification a revision was made to make the chemical requirements for screw stock agree with the society's general screw stock specifications. The committee has formally advised the Society of Automobile Engineers that "it will recommend these revisions for adoption as standard a year hence, and has requested that society to consider the revision of their specifications as to the requirements for screw stock so that the specifications of the two societies may still agree."

Structural Steel for Ships

The consideration of special requirements for permissible variations in weight and thickness of sheared plates for ship use has not yet been taken up, as it has been felt desirable to permit shipbuilders to become acquainted with the permissible variations proposed and adopted last year, before proceeding with the preparation of special requirements for ship use.

Acceptability of Electric Steel

The committee has ruled that electric-steel billets should be acceptable under the specifications covering billet-steel concrete reinforcement bars, but will not recommend it for consideration until other more important changes may be in view. The committee believes that electric steel may always be sold acceptably in place of open-hearth steel wherever the latter is specified in A. S. T. M. specifications.

Reinforcement bars manufactured from discarded steel axles are not acceptable, as test by heat lot is required.

Boiler Steel

The only recommendation which the committee made this year with reference to boiler steels was the elimination of the requirement for copper in firebox steel for both locomotives and stationary service.

Order of Reporting Physical Properties

The committee recommends that the order of reporting physical properties of steel shall be as follows: Elastic limit, proportional limit and yield point; tensile strength; percentage of elongation, and reduction of area.

Metal Primer Tests

In a session devoted to preservative coatings, Thursday morning, June 28, a paper was read by H. A. Gardner, assistant director Institute of Industrial Research, Washington, describing a series of exposure tests made

on paints applied to large-size metal plates, 24 x 36 in., with the object of determining what grade of pigment is best suited for use as a priming coat. After three years' exposure, the panels to which had been applied a single coat of red lead containing a substantial percentage of litharge were in better condition than the panels painted with a single coat of highly oxidized red leads or iron-oxide paints. Those portions of the panels to which had been applied two coats of paint, gave substantially the same relative results, much greater durability being shown as compared to the single-coated surfaces. The paints used were reserved, examined and analyzed after storage for three years. The highly oxidized red leads in general were not in superior condition to the others, except in one instance where a red lead of low specific gravity was used. The other paints were soft and in excellent condition.

A. W. Carpenter, assistant valuation engineer, New York Central Railroad, New York, told of experiences with 82 to 94 per cent red lead paints and how he came to the conclusion that the proportion of litharge was not so important as represented and he could hardly see why iron oxide paints should not be used particularly with red-lead paints 300 per cent higher in cost.

Misrepresentation of the Chamber of Commerce of the United States

In very vigorous language, the Chamber of Commerce of the United States, through its executive committee, of which Joseph H. Depew is chairman, has denounced allegations recently made by the One-Cent Letter Postage Association, which has its headquarters in Cleveland. In one of its circulars, the association stated that the chamber's committee on war finance was threatened with active newspaper and magazine opposition if it dared to advocate an advance of second class rates. This statement is branded by the executive committee of the national chamber as "without the slightest basis in fact." Another paragraph of the association's circular stated that a sub-committee of the chamber's committee on war finance requested the support of the Post Office Department for the proposed advance in letter postage and was refused. This statement is declared by Chairman Depew to be wholly false. He adds that the attacks in the circulars issued by the National One Cent Letter Postage Association upon directors and officers of the National Chamber "are so contemptible that they must fall of their own weight, and the officers desire to make no response." The by-laws of the chamber provide that it cannot be committed to or support any policy except after a vote of its membership. The referendum recently completed by the National Chamber indorsed the plan of increasing first class letter postage to three cents as one of several means of raising the required funds to meet war expenses, and on this account the One Cent Letter Postage Association has made numerous attacks on the chamber.

Companies Consolidated

The Riverside Engine & Machine Co., Oil City, Pa., and the Pittsburgh Filter Mfg. Co. of Pittsburgh have consolidated, and the name of the concern in future will be the Pittsburgh Filter Mfg. Co. The Oil City plant will be operated as heretofore, its principal products being lathes and oil engines. The Pittsburgh Filter Mfg. Co. makes industrial and municipal filtration machinery. Some of this work will be done at the Oil City plant, which will be expanded as business warrants. The officers of the new company are A. R. Fraser, president and treasurer; F. B. Leopold, vice-president; John F. Hume, general manager. The general office and sales department will remain in Pittsburgh.

The Columbian Facing Mills Co., Seneca and Bailey Streets, Buffalo, has been formed by Harry and Max Hainsheimer. At present space in the Progressive Structural Steel Co.'s building is being utilized but a new plant at Stone and Green Streets is being erected. Facings and foundry supplies will be manufactured.

MILLIONS FOR AIRPLANES

Preparations for Manufacturing on Large Scale Being Hurried

Orders for $20,000,000 worth of airplanes have been placed with the Curtiss Aeroplane & Motor Corporation by the United States Government and the Allied Governments during the past few months. This announcement was made following a meeting of the directors in New York last week. John N. Willys of the Willys-Overland Co. was elected a member of the voting trust, succeeding James Imbrie of the banking firm of William Morris Imbrie & Co. J. E. Keeperley was made a director of the Curtiss corporation, succeeding G. Meyer. Mr. Willys will become president of the Curtiss Aeroplane & Motor Corporation.

An increase in the capital stock of about $2,000,000 was authorized, the money realized from the sale of 63,000 shares of common stock at $35 a share to be devoted to plant extensions and equipment. A new airplane engine factory will be erected by the Willys-Overland Co. at Toledo, Ohio, in close proximity to the automobile factory. This plant, however, will not cost $3,000,000, as at first reported. Additional space has been taken by the Curtiss corporation in Buffalo. The Willys-Overland factory at Elmira, N. Y., as previously announced, has been given over to manufacture of parts of airplane engines. Orders for machine tools aggregating several hundred thousand dollars were placed last week for the Willys-Overland plants.

Other plans of the Aircraft Product Board to carry out the Government proposed $600,000,000 airplane program are showing progress. The newspapers have announced the safe arrival in London, England, of 125 aircraft experts, who will study the manufacture of airplanes in England and France and their operation at the battlefront. Orville Wright, who is busy making experiments on improvements in airplane manufacture at his laboratory at Dayton, Ohio, announces his belief that 10,000 airplanes released on the battle line would end the war.

The Aircraft Production Board, which is the sole organization charged by the Government with the work of getting together the required number of airplanes, being responsible only to President Wilson and the Cabinet, are Howard E. Coffin, chairman; E. A. Deeds, formerly vice-president and general manager of the National Cash Register Co., Dayton, Ohio, and now at the head of industries in Dayton doing an annual business of $80,000,000; Sidney D. Waldon, formerly vice-president of the Packard Motor Car Co., Detroit, and Robert L. Montgomery, senior partner of the banking firm of Montgomery, Clothier & Tyler of New York and Philadelphia. The Army is represented on the board by Brig. Gen. George O. Squier and the Navy by Rear-Admiral David W. Taylor.

Owing to the backwardness of this country in airplane development along manufacturing lines, it will be necessary to call upon the automobile industry for a large part of the manufacturing.

Canadian Bounties

According to the latest report issued by the Department of Trade and Commerce at Ottawa, Ont., the following trade bounties were paid out in one year:

Metal	Amount, Tons	Bounty
Pig iron	5,431,547	$7,097,041
Puddled iron bars	42,812	113,674
Steel	4,448,780	6,706,990
Manufactures of steel	499,312	2,868,122
Lead (pounds)	1,187,083,350	1,979,164
Manila fibre (pounds)	108,048,641	367,962
Crude petroleum (gallons)	169,134,123	2,537,012
Total bounties paid		$21,669,965

The Lincoln Electric Co., Cleveland, manufacturer of polyphase motors, arc welding machines and battery charging plants, has opened an office at 10 High Street, Boston, under the direction of W. A. Blachford.

RATE DECISION RENDERED

Coal, Coke and Iron-Ore Freights Are Advanced in Some Sections

WASHINGTON, July 2.—The petition of the railroads of the United States for a horizontal increase of 15 per cent in freight rates was denied by the Interstate Commerce Commission in an elaborate opinion handed down June 29. This denial was somewhat tempered by an expression of the commission's willingness to increase class rates in the Eastern district about 14 per cent, which, in view of the fact that more than one-fourth of the freight handled is moved under class rates, allows the Eastern lines approximately 4 per cent increase in their gross freight revenues. Increases on coal, coke and iron ore have already been permitted in the Eastern district, as heretofore stated in the IRON AGE, and the commission states that similar increases will be allowed in the Southern districts on coal, coke and iron ore, and in the Western districts on coal and coke, these concessions being made to preserve the rate relationships between the several districts.

The refusal of the commission to increase rates is based chiefly upon the conviction on the part of the commission, as stated in its report, that the railroads are now so prosperous that they do not need the higher rates sought. It is admitted that the roads are facing higher costs of operation as the result of war prices for materials and labor, but, on the other hand, it is contended that, generally speaking, war conditions have aided the roads more than they have injured them and that especially the mobilization of troops and the moving of war supplies have enabled the carriers to secure extra profits.

In dealing with the great volume of statistical matter upon which the roads based their pleas for an advance, the commission calls attention to the fact that the comparisons instituted by the carriers have been chiefly with the statistics of 1916, which was an extraordinary year in railroad earnings. The proceedings under review were brought last March at a time when the February returns had just been made covering one of the worst months in railroad history. In March and the succeeding months, gross and net revenues showed very satisfactory increases, while expenses did not equal the pessimistic expectations of the carriers. The decision of the commission is in part as follows:

"We are led to the conclusion that no condition of emergency exists as to the Western and Southern carriers which would justify a general increase in their rates to become effective. In the Eastern district, increased rates have recently been permitted to become effective generally on bituminous coal, coke and iron ore. We think that similar increase may properly be permitted in the Southern district on coal, coke and iron ore, and in the Western district on coal and coke. This will preserve rate relationships between the several districts.

"In the Southern district, the proposed increased rates on coal are on the basis of 15 per cent, with a maximum of 15 cents per ton. These tariffs we shall permit to become effective. In the Western district, the increases are based upon 15 per cent, with a minimum of 15 cents per ton. These tariffs will be suspended, but the Western carriers may, if they so elect, file new tariffs carrying increases in rates on coal and coke not exceeding in any case 15 cents per ton.

"All of the tariffs included in this proceeding of the Western lines will be suspended. All of the tariffs included in this proceeding of the Southern carriers will be suspended, excepting those applying on coal, coke and iron ore.

"For reasons indicated in this report, we shall suspend all of the tariffs before us in this proceeding of the Eastern carriers excepting those applying on iron ore. As has been indicated, however, the conditions confronting the Eastern carriers are substantially different from those confronting the Southern and Western carriers, and we are persuaded that they are entitled to increased revenue beyond and above that which they are securing and will secure from the increased rates on bituminous coal, coke and iron ore."

World's Tallest Chimney Erected in Japan

The highest chimney in the world was completed in December last by the Weber Chimney Co., Chicago, for a copper smelter at Sagonoseki, Japan. It is constructed of concrete, 570 ft. high, 26¼ ft. inside diameter at the top, and 42 ft. in diameter at the base. Its purpose, of course, is to carry the fumes from the smelter to an altitude that will so far as possible avoid the killing of surrounding vegetation. It sets on a hill 430 ft. above the furnaces and its top is therefore 1000 ft. above the copper plant.

The foundation, which is 95 ft. in diameter, contains 2700 cu. yd. of concrete and required 30 days to build. It rests on gravel, and supports 6000 lb. per sq. ft., figuring the weight of the chimney and the force exerted by the wind. For 150 ft. the chimney is reinforced by a concrete lining separated from the outer wall by a 5-ft. air space. The opening at the base is 31 ft. high and 20 ft. wide. The flue connecting the furnaces and chimney is 30 ft. in diameter and 2500 ft. long, and is provided with openings to enable the cleaning of the big tube.

In the construction of the chimney 400 tons of steel was used. All wind stresses are cared for by vertical reinforcing rods, mill lengths being used. The temperature and shearing stresses are cared for by horizontal rings encircling the vertical bars. Under the maximum strain the stresses are figured not to exceed 16,000 lb. per sq. in., and the compression on the concrete at 550 lb. per sq. in. In erecting, all scaffolding was on the inside. The contract was closed in February and the work completed in December.

Construction work was directed by Charles P. Woodworth, vice-president Weber Chimney Co., assisted by five Americans who gave directions to native labor and set the forms. The fittings for the forms were sent from the United States, but the lumber was purchased in Japan.

Uranium Steel for Gun Linings

The production of ferrouranium from the uranium oxide obtained as a by-product in the extraction of radium from its ores is to be investigated by the Bureau of Mines. Ferrouranium is used in making uranium steel, used in Germany for the linings of big guns, which, it is claimed, stand up at a rate of fire so rapid that other steels fail. Work will soon be begun on the production of sample lots of uranium steel and other special steels, for test by the Bureau of Ordnance of the War Department as to their suitability for use in guns. The work on gun steel will also require the use of electric furnaces. It has not yet been decided whether this work will be done at Cornell or at one of the other universities which have offered facilities.

The Irwin Auger Bit Company, Wilmington, Ohio, has announced that an insurance policy of $500 will be carried free for each man in its employ that enlists for the war. The company for some time since has been carrying a policy of $1,000 life insurance on each employee and the extra $500 for those who go to war will make a total amount of insurance for them of $1,500.

The June meeting of the Pittsburgh Foundrymen's Association took the form of an outing, which was held at the Westmoreland Country Club, near Pittsburgh. Entertainment was provided, and a dinner was given in the evening. No meetings of this association will be held in July and August, the first of the fall and winter meetings to be held on Sept. 17.

Japan's pig-iron output in 1916 was 65,014 tons, against 64,897 tons in 1915, according to the Imperial Department of Mines. The copper output was 81,240 tons in 1916 and 75,415 tons in 1915.

CASE-HARDENING BY BORON*

Successfully Applicable to Machine Parts Where Much Wear Is Involved

BY PROF. N. TSCHISCHEWSKY

ON an inspection of the diagram of iron-boron alloys (THE IRON AGE, Aug. 24, 1916), it will be seen that on cooling these alloys the boron is not wholly combined in the form of borides of iron, but a proportion of it is left in the form of a hard solution. This phenomenon suggests the possibility of case-hardening steel by boron, similarly to the case-hardening of iron by carbon. Alloys of iron with boron are remarkably hard, so that they can scarcely be treated on an emery-wheel. The technical application of case-hardening by boron suggests itself therefore as a feasible industrial operation.

The complete cementation that takes place in carbon steel is not the type of operation the author has in mind, but a surface cementation. It is more convenient to obtain a ferroboric alloy by melting on account of the high price of boron, and also to secure its complete use without wastage.

The use of boron is not perhaps suitable for armor plates, because of its comparative scarcity, but for some machine parts and, generally speaking, where much wear occurs, boron can be applied with success. While annealing is necessary in order to confer the necessary hardness on articles case-hardened by carbon, boron confers hardness without the necessity of any special heat treatment.

To ascertain the conditions of case-hardening by boron, the author took a sample of iron of the following composition:

	Per Cent
Carbon	0.12
Silicon	0.02
Manganese	0.16
Phosphorus	0.06
Sulphur	0.04

And as a case-hardening powder, pure amorphous boron and a finely powdered rich alloy of iron with boron containing about 19 per cent of boron were taken.

The pieces of soft iron used were in the shape of cubes, holes being drilled in the center to a depth of about half their length. These holes were filled with fine amorphous boron, or with powdered ferroboron. The holes were closed by stoppers made from iron of the same quality, these stoppers being pressed home by means of a hydraulic press. The powder being thus compressed, a good contact was secured between it and the sides of the sample, which was thus hermetically sealed. Specimens prepared by this method were heated in a Heræus furnace in a silica tube. The temperature was measured by a Le Chatelier pyrometer, of which the thermo-junction was placed close to the specimen. In order to eliminate the influence of a gaseous medium, the whole of the air from the silica tube was removed by means of a mercury pump. The samples after heating during several hours showed no trace of oxide on the surface.

Fig. 1 shows two samples which were heated for two hours at 950 deg. Specimen I contains amorphous boron, and specimen II powdered ferroboron. Both samples were cut across longitudinally by means of a steel saw, and the cut surfaces polished.

At the lower part of Fig. 1 are seen the stoppers, which are sometimes marked with thin bands, resulting from the contact with the cement powder left on their sides. The dark area over the stoppers represents the compressed cementing powder. The volumes of the compressed powders decrease partly on account of nodulizing, partly owing to absorption by the sides of the specimens. The bands represent an alloy of iron with carbon, and can clearly be seen in the vicinity of the spaces containing the compressed boron or ferroboron. Under the conditions of the experiment (950 deg. and two hours' heating) the boron penetrated the iron to the depth of 1 millimetre.

From the experiment it was ascertained that cementation by powdered ferroboron proceeds more easily and quickly than with amorphous boron. Microscopical examination shows that the hard white layer of the case-hardened part of the specimen consists of compact boric pearlite, with a twin crystal structure.

The photomicrograph of this portion is shown in Fig. 2. The edges of this layer contain a sub-eutectic alloy of ferrite-pearlite, Fig. 3.

The ferrite in this instance contained the boron in hard solution, this being explained in the author's paper dealing with the diagram of iron-boron alloys previously referred to.

Case-hardening at a lower temperature yields an alloy of iron containing less boron. This alloy is not so hard and brittle as that already described. In order to render the process of case-hardening by boron suitable for industrial purposes, it would be necessary to carry out a series of experiments on the conditions most suitable to the particular purpose in view.

Fig. 1 Shows Cubes of Iron: I Containing Amorphous Carbon and II Containing Powdered Ferroboron. The illustration was taken at about 350 diameters. Fig. 2 represents boric pearlite of twin crystal structure. Fig. 3 shows the subeutectic alloy of ferrite-pearlite

*From a paper presented at the Iron and Steel Institute, London, May 3, 1917. The author is a professor at the Tomsk Institute of Technology, Tomsk, Russia.

Austria-Hungary's Steel Output in 1916

The steel output of Austria-Hungary in 1916 exceeded that of any previous year. The total was 3,336,607 metric tons, against 2,686,226 tons in 1915 and 2,200,000 tons and 2,700,000 tons in 1914 and 1913 respectively. The 1916 increase is about 24 per cent over that of 1915. The comparative output in the last two years is as follows in metric tons:

	1915	1916
Bessemer steel	241,690	343,714
Open-hearth steel	2,370,947	2,893,409
Forge iron and steel	23,543	18,204
Crucible steel	26,151	34,033
Electric steel	23,895	47,247
Totals	2,686,226	3,336,607

The increase in the output of electric steel is noteworthy—over 100 per cent under war conditions. The increase in open-hearth, Bessemer and crucible production is large. Austria produced 2,501,070 tons of the 1916 total and Hungary 813,433 tons.

Boiler Makers' Meeting at Pittsburgh

Progress of Movement to Get Nation-Wide Uniform Specifications—Why Further Modification of Marine Boiler Inspection Laws Is Necessary

PROGRESS toward the establishment of a uniform boiler code was made at the annual convention of the American Boiler Manufacturers' Association held in Pittsburgh at the William Penn Hotel, June 25 and 26. Resolutions were passed requesting the United States Board of Supervising Inspectors of the Steamboat Inspection Service and the Massachusetts Board of Boiler Service to modify their rules and regulations to accord with the boiler code of the American Society of Mechanical Engineers. Other notable features of the meeting were noted in last week's issue of THE IRON AGE.

E. R. Fish, vice-president and secretary Heine Safety Boiler Co., St. Louis, emphasized that the requirements of the Board of Supervising Inspectors for boiler plates and details of manufacture are not according to accepted practice and that steel mills have invariably asked higher prices for marine plate than for other grades of material. The conditions which have arisen because of the war, he held, require a change in practice, and the Shipping Board, he said, seems perfectly willing to accept that A. S. M. E. code as the basis for the construction of boilers. He also pointed out that boilers constructed for the Shipping Board would eventually pass into private ownership and come under the supervision of the United States Inspectors and in anticipation of this, the Steamboat Inspection Service amended its rules, changing the requirements of boiler plate substantially to those of the A. S. M. E. code, the principal difference remaining being that in regard to the minimum tensile strength permitted. However, he explained, steel mills are inclined to regard plate rolled under the amended rules as marine plate and charge accordingly. In his opinion, the requirement of the United States Inspection Service making 58,000 lb. per sq. in. the minimum tensile strength is unjustified and he pointed out that Lloyd's authorities accept plate as specified by the A. S. M. E. code, basing their calculation of pressure upon the minimum tensile strength shown by test. The present regulations of the Inspection Service, he continued, made it difficult and expensive to obtain plate and manufacture boilers.

Conditions After the War

That the United States is going to build sufficient ships to replace losses and establish a merchant marine by the end of the war was claimed by Hon. E. S. Sweet, assistant secretary of commerce, Washington, speaking on "Industrial Co-operation in the War." He emphasized the point that the present war offers problems of science and industry in shipbuilding and that the manufacturers of the country are going to be an important factor in the final decision. He pleaded for co-operation by the boiler makers and the Government. Outlining the work of the Bureau of Commerce, he stated that the increase in exports between 1913 and 1916 were partly due to the work of the Government which had sent out eight commercial attaches to Europe for the purpose of stimulating export trade. After the war, in his opinion, friendship will play an important part in the trade of nations and he hoped that after the war the feeling of the American people to the German people will be friendly and that the United States would be influential in establishing an international trade commission for the promotion of a spirit and good will between nations in trade.

Misuse of Boilers

S. F. Jeter, chief inspector of the Hartford Steam Boiler Inspection & Insurance Co., told how boilers are frequently damaged in shipment previous to their installation and after having been properly inspected in the shop. In one instance a boiler was used for straightening an I-beam; the boiler was suspended by chains from a crane and used as a hammer. This occurrence, he admitted, was exceptional, but shows the extent of rough treatment that may be given a boiler previous to installation. The shop boiler inspector, he pointed out, must be a high grade of man and that if he is he serves equally well the manufacturer and the consumer.

D. M. Medcalf, chief inspector, Toronto, Ontario, stated that boiler shops in Canada are making shells as well as boilers but are handicapped in their work because of the shortage of material and labor conditions. Good boiler makers, he stated, cannot be obtained and conditions are such that new equipment is scarce and second-hand boilers are being readily accepted. The demand for marine boilers, he stated, is extraordinary and Ontario has undertaken the establishment of plate mills to aid in supplying sufficient plates.

Specialization in Manufacture

Quoting Charles M. Schwab saying: "We are entering an era of co-operation where we are beginning to see that the success of any business does not consist in the failure of its competitors," W. H. S. Bateman, Champion Rivet Co., Philadelphia, pleaded for closer co-operation of boiler manufacturers and the elimination of unfair and unscrupulous competition so common during normal times. He also pointed out the necessity of specializing in the boiler business. The present tendency to this end, he said, is shown by boiler mnaufacturers in some cities dong only marine work, while others build water-tube boilers and special type boilers. Still others devote their time and plant to return tubular boilers.

He emphasized that boiler manufacturers cannot efficiently manufacture both tanks and boilers and should devote their plant to either one or the other. Many of the boiler building concerns, he stated, which are operating shops five or six times as large with more and heavier machinery than they ever thought of using for boilers, are devoting their entire attention and efforts to the building of tanks and general plate construction.

National uniform boiler inspection laws, in his opinion, were an urgent need and would operate as well as the federal locomotive boiler inspection laws are said to operate. No state with uniform boiler inspection laws in force, he pointed out, could with its own special laws keep the manufacturer of another state from coming in and taking boiler business, provided the requirements are met. He made a plea for the use of uniform specifications and the frank discussion of standards, methods of production and labor cost involved in the manufacture of boilers to the enlightenment of all the members.

Officers for Ensuing Year

Officers were all re-elected except one member of the executive committee, whose place has been taken by E. R. Fish; they are as follows:

President—M. H. Broderick, Broderick Mfg. Co., Muncie, Ind.

Vice-President—C. V. Kellogg, Kellogg & Mackay, Chicago.

Secretary and Treasurer—H. N. Covell, Lidgerwood Mfg. Co., 191 Dikeman Street, Brooklyn, N. Y.

Executive Committee—W. C. Connelly, D. Connelly Boiler Co., Cleveland; G. S. Barnum, Bigelow Co., New Haven, Conn.; E. C. Fisher, Wickes Boiler Co., Saginaw, Mich.; E. R. Fish, Heine Safety Boiler Co., St. Louis; Louis Mohr, John Mohr & Sons Co., Chicago.

Visit to National Tube Works

Wednesday morning, June 27, the boiler manufacturers visited the National Works of the National Tube

Co. at McKeesport, Pa., inspecting the 42-in. universal skelp mill, the 13-in. skelp mill, the 16-in. skelp mill and the lap weld and butt weld tube mills. W. A. Cornelius, manager of the National Works, and A. M. Saunders, superintendent Upper Works, directed the party. The noticeable features of the plant were the safety measures and the cleanliness; also the process of spelerizing and methods of testing tubes by hydraulic pressure and crushing. The boiler manufacturers were also interested in a fence, part of which was made of steel tubing and part of iron tubing. This fence has never been painted, has been up approximately ten years and is used to determine the relative extent of corrosion between iron and steel.

The afternoon was finished by a drive to the Youghiogheny Country Club, where luncheon was served.

ENGLAND'S WAR SUPPLIES

Minister of Munitions Makes Interesting Statement to House of Commons

Great Britain's gigantic war supply business was graphically presented to the House of Commons June 28 by Dr. Christopher Addison, Minister of Munitions, speaking on the estimates for his department. Dr. Addison declared incidentally that negotiations were now in progress for the consolidation of American and British interests, which should add greatly to the resources of the Allies and effect material economies in purchasing. Dr. Addison said 1,500,000 tons of material for his department were shipped monthly from the United States and Canada. Of this amount the total loss from the submarines since the ruthless warfare began reached only 5.9 per cent. Up to March last, the production of explosives in England had quadrupled in a year, and the increase over March, 1915, had been 28 times. More than 2000 miles of railway track had been laid back of the fighting front, mostly track pulled up in England, Canada and Australia, and nearly 1000 new locomotives were at work. The annual production of steel had been raised from 7,000,000 to 10,000,000 tons, and would reach 12,000,000 tons. A million and a half steel helmets had been distributed in six months. And in all this work a saving of $215,000,000 had been effected. From 60 to 80 per cent of the machine work on shells, fuse and other supplies is done by women.

He paid tribute to Kenneth Quinan, a California engineer, who designed and equipped the new factories.

"He is not the only American citizen who has assisted the Ministry of Munitions throughout its career," said the minister, "but in the great work at Queensferry, Gretna and other places we come possessed through his genius of factories which to a very large extent will be of permanent value to peace industries."

The Ministry had recently reached such a state of production with respect to gun munition, he said, that it was able to divert certain national factories to assisting other sections of the munitions program.

Munitions Efficiency Proved

The requirements regarding the accumulation of a great reserve of field gun ammunition would be met in good time, he said, and, despite the enormous expenditure in the first nine weeks of the offensive, the stock of filled shells had only fallen off 7 per cent. Field Marshal Haig had enthusiastically reported on the accuracy and fine detonating quality of the ammunition.

The output of machine guns and rifles was fully equal to the demands, while for railway purposes tracks pulled up in England, Australia and Canada had been utilized. Canada had arranged to pull up 800 miles of track and ship it complete when wanted. One thousand locomotives had been sent from the colonies, apart from hundreds supplied by the railways.

The demands for steel were so many that the control had been very close, and, despite all the help from Canada and the United States, he could not offer any immediate prospect of relief. Notwithstanding the cost of material and labor, the Government was obtaining steel plates in this country at less than half their cost in the United States, while shell steel cost 30 per cent less.

Referring to salvage operations at the front, the Minister said it was now possible to re-form hundreds of thousands of 18-pounder cartridge cases weekly at a cost of four pence each, compared with seven shillings for new cases.

The work of the Ministry, he said, had almost doubled within the last 12 months. The aircraft supply alone at the beginning of the year required an additional 10,000 workers, and that which applied to the aircraft applied also to shipbuilding, gun making, tanks, agricultural implements and other necessaries of war.

The widespread employment of women had been attended, singularly, with little difficulty. From 60 to 80 per cent of the machine work on shells, fuse and trench warfare supplies was done by women.

Shipbuilding in Canada

TORONTO, ONT., July 2.—That there has been wonderful development in shipbuilding in Canada is evidenced by some figures on the amount of shipbuilding going on in the Dominion at the present time, Hon. J. D. Hazen, Minister of Marine and Fisheries for the Dominion, has announced. Perhaps the most remarkable achievement is the number of wooden sailing vessels, before the war thought to be obsolete, now being built. At present, 57 of these vessels are under construction for Atlantic service. On the East coast, Mr. Hazen stated, there are 13 steamers being built, two of them cargo vessels of steel construction. On the Great Lakes, 22 steamers are under way, one of which will be 7360 tons, of steel construction.

Among the more important of the steel shipbuilding companies can be enumerated the Port Arthur Shipbuilding Co., Port Arthur, Ont., with a capacity of eight 261-ft. boats a year; the Collingwood Shipbuilding Co., Collingwood, Ont., with a capacity for another eight; the Thor Iron Works and the Polson Iron Works, Toronto, with a capacity of four and eight respectively; the Kingston Shipbuilding Co., Kingston, Ont., two ships; the Canadian Vickers, Montreal, 10 or 12 a year; the Davis Co., Quebec, three, and the Nova Scotia Steel Co., Pictou, N. S., four a year. The shipyards located at ocean ports are naturally building the larger type of ocean-going freighters. To encourage shipbuilding in Nova Scotia, Premier Murray has introduced a bill in the Legislature providing for the appointment of a shipbuilding commission of five members and a secretary, to provide ways and means of developing the industry.

To the Polson Iron Works, Toronto, goes the honor of launching in one day from one set of ways four fishery protective vessels, a feat never before known in the history of the shipbuilding industry on either side of the Atlantic. The Polson Iron Works is also constructing 10 3500-ton steamers, all of the same type and built to British corporation specifications highest class for ocean service. The last of these boats is to be completed before the close of navigation in 1918. The plate and material has been purchased and is being delivered.

There are at the present time under construction in Canadian shipyards merchant steamers totaling approximately 150,000 tons carrying capacity. The cost of producing this tonnage will be in the neighborhood of $25,000,000. In addition there are under construction in Canada's shipyards wooden vessels aggregating a total carrying capacity of about 30,000 tons.

The American Forging Co., Clifton, N. J., will commence hammering commercial forgings July 1 and will be able to make anything up to 5000 lbs. to Sept. 1, when larger tools will be installed.

FORTIFYING ITS POSITION

American Car & Foundry Co. Report Shows Conservative Policy

The American Car & Foundry Co. is using its very large earnings to a large extent to improve its financial condition. The annual report of the company for the year ended April 30, 1917, shows that the net earnings for the year, after renewals and repairs, amounted to $10,310,871, as against $2,816,018 in 1916, $2,330,936 in 1915, and $9,347,084 in 1907, the next best year to 1917. The large net earnings of the year remained after writing off the entire cost for special equipment for the production of munitions. After paying dividends of 6½ per cent ($1,950,000) the remainder of the net earnings was disposed of as follows: Added to reserve for general overhauling, improvements and maintenance, $2,500,000; special reserve for improving working conditions of employees, $500,000; added to reserve for dividends on the common stock, $2,250,000, making in this reserve with the balance carried over from preceding year a total of $2,400,000, equivalent to 8 per cent on the entire common stock. After making all these deductions, $1,010,871 was added to surplus account.

The net income for the year ending April 30, 1917, and preceding years has been as follows: 1917, $10,310,871; 1916, $2,816,018; 1915, $2,330,936; 1914, $3,757,971; 1913, $3,328,593; 1912, $2,839,232; 1911, $4,234,789; 1910, $4,089,478; 1909, $2,895,831; 1908, $8,961,380; 1917, $9,347,084.

President W. H. Woodin in his report said in part:

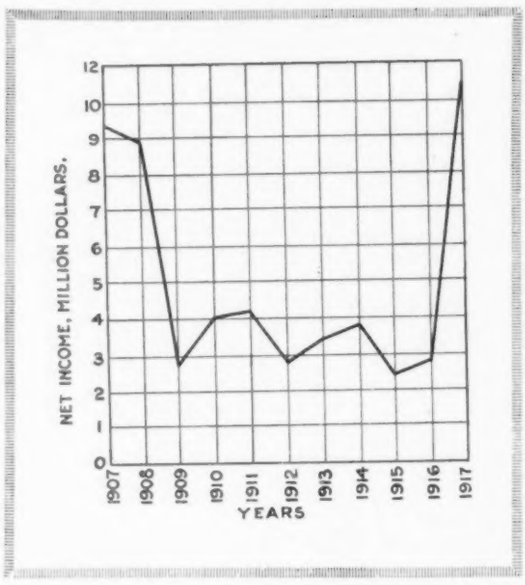
"Your company was among the first to place its facilities unreservedly at the disposal of the Government, to be put to such use as might best suit the national needs. Already some portion of the work which our country has taken upon itself as its part in the righteous war in which we are engaged has been allotted to your company, and it is a fair assumption that we shall hereafter be called upon to play an increasingly greater part in the struggle that lies before us. Our Government, and the stockholders, may be assured that this company will give of its best—in experience, in organization, in production—to insure the making of that lasting peace short of which the United States and its allies will not stop.

"From the viewpoint both of operations and results, the year has been a satisfactory one. The performance of your company in the production of munitions has been gratifying, not only as to quality, but also with respect to volume and speed of production, and has not been excelled by any other company in the United States. The representatives of the governments for which your company has been producing munitions have been unstinted in their expressions of approval of its organization and methods. The experience acquired in this branch of industry will without doubt prove of very great value to our Government, enabling your company quickly and economically to meet what promises to be a very large demand for such supplies.

"A fair share of the year's earnings resulted from the conduct of your company's ordinary business in the manufacture and sale of cars and miscellaneous supplies. Material costs have been high, and are likely to continue so. This, together with the increased cost of operating, coupled with an inability to obtain a corresponding augmentation of revenue, makes it growingly difficult for the railroads to finance the purchase of new equipment in quantities sufficient to meet the normal traffic requirements of the country. The need of means of transportation, both for domestic and for foreign use, is so great, however, that it is reasonable to expect that, with the advent of more propitious conditions, your company's facilities for this line of production will continue in fair demand.

"At the close of the year your company had on its books for construction a greater number of cars than at the beginning.

"The wisdom of strengthening at this time the reserve for general overhauling, improvements and maintenance, and the reserve for dividends on common capital stock, is apparent. This latter reserve will be drawn upon as occasion may require, for the paying of dividends on the common stock as and when such dividends shall be declared."



Net Earnings American Car & Foundry Co., 1907-17

To Improve Express Service

Manufacturers of steel castings and many other kinds of products have been much annoyed for a long time by articles being lost when shipped by express and there are now in the offices of express companies, many thousands of pieces from which the addresses have been lost. In order to improve the service the Express Traffic Association has been formed by leading express companies with headquarters at 61 Broadway, New York. F. J. Airy is secretary and vice-presidents of a number of express companies assist in the management. Numerous iron and steel shippers are co-operating with the association and it is hoped that many more will do so. To prevent losses in shipment, shippers are being asked to give all material shipped two sets of markings, one to be the customary shipping tags and the other a special marking to be used for emergency when the former marking becomes disfigured or lost. This, to a large extent, will be left to the judgment of the individual assembler. In the case of rivets, for example, an additional tag will be put inside the bag in addition to the tag attached to the outside. For bars, in addition to the stenciling or tagging where the section of the bar is too small to stencil, a paster or tag will be put on the bar, which will be wrapped in burlap and thus kept clean and not detached.

Refining Hot Metal in Electric Furnaces

Duplexing hot metal from open-hearth into electric furnaces will soon be the practice of the Charleston Steel Co., Belle, W. Va. The company has nearly completed one 8-ton open-hearth furnace, which will be delivering hot metal to the electric furnaces in about two weeks. A 15-ton open-hearth furnace will also be erected, work on it to start about July 15. The Rennerfelt electric furnaces, originally installed at this plant, have been modified by introducing the three electrodes through the roof. H. G. Scott is the president and Charles A. Swan, manager.

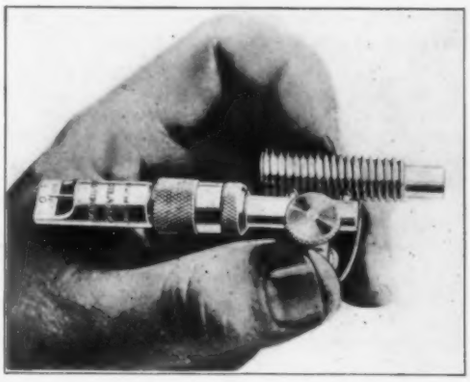
Park & Williams, Philadelphia, dealers in iron and ores, have taken out incorporation papers in Pennsylvania, capitalization being $25,000. The firm will shortly move its headquarters from the fifteenth floor of the Real Estate Trust building, to the seventeenth floor.

Indicator for Lead on Screw Threads

A device for testing the lead on external and internal screw threads has been brought out by the Bicknell-Thomas Co., Greenfield, Mass. Screws of any of the customary diameters can be measured and the smallest size of tapped hole that the indicator will enter is ½ in. in diameter. This, it is pointed out, enables the lead of the thread on the small sizes of screws and the tapped holes in which they fit to be tested.

The device consists of two points which are capable of adjustment for various leads, mechanism for transmitting the motion of these points to the indicating needle and a set of graduations to show the departure of the lead from the normal amount. A table on which the screw rests when being tested is provided. This can be adjusted to accommodate various diameters of screws and when internal threads are being measured the thumb screw holding the table in place is loosened and the latter removed. A master is furnished with each gage to enable the operator to make certain that the needle point is on the zero mark when the gaging points are properly spaced. If it is necessary to test threads having odd pitches, such as 13 threads to the inch, a master can be furnished for adjusting the indicating needle.

In use a screw is placed on the indicator which is held in one hand, preferably the left, and is pressed against the two points which are spaced ¼, ½ or 1 in. apart, as may be desired. The indicator needle will remain at the center graduation, which is zero, if the lead of the thread is normal, moving downward toward the plus side if the lead is long and in the opposite direction if the lead is short. The exact amount of discrepancy is indicated by the graduations, each of



Any Variation from the Proper Lead of Internal and External Screw Threads Is Indicated by the Pointer and Graduations at the Left

which corresponds to 0.001 in. For internal threads the procedure is the same except that the table is removed as mentioned and the indicator is inserted in the tapped hole.

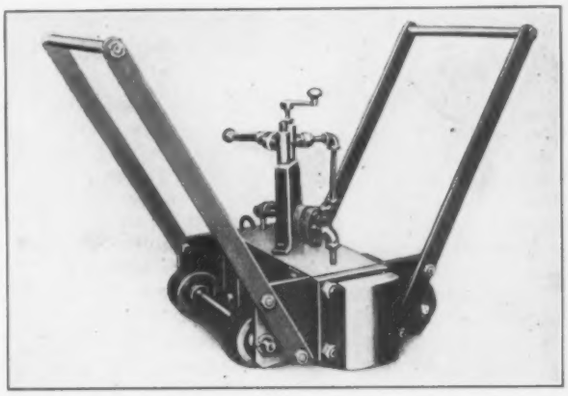
Ferguson Steel & Iron Co. Additions

Completion of additions within a month will make the plant of the Ferguson Steel & Iron Co., Buffalo, N. Y., ten times larger than it was at the inception of the company four years ago. The fabricating shop, which is nearing completion, is 760 ft. long and 130 ft. wide. It contains about 850 tons of steel. The warehouse, which has heretofore been used for fabricating, is being stocked heavily with steel. From one end to the other the two shops measure 1300 ft. in length. An addition 40 by 30 ft. and two stories is under construction and will house a part of the drafting department. Another addition 40 x 50 ft. is being made to the main office building, due to the unusual increase in the office and sales forces, which now number about 85 men.

Wheelock, Lovejoy & Co. of Cambridge, Mass., and New York, have opened a warehouse and office at 1800 Columbus Road, Cleveland, carrying a stock of their machinery steel.

Bending Machine for Ship Material

For bending heavy structural steel shapes used for ship frames, deck beams, etc., the Watson-Stillman Co., 190 Fulton Street, New York, has developed a portable



Heavy Steel Shapes Can Be Bent for Ship Frames, Deck Beams, etc., by This Portable Hydraulic Machine, Which Develops 18 Tons

machine. It is operated by hydraulic power supplied from a pump or accumulator. The construction is compact and an effort has been made to keep the weight as light as is consistent with the work that has to be performed. It is intended, of course, to do the bending without reheating of the material and with a minimum amount of labor.

The machine, which is mounted upon broad rollers enabling it to be moved over the bending slabs by handles at either side, consists of a cylinder, ram and operating valve. A loose pin is provided that fits into the holes in the bending slabs and serves as an abutment for the machine. The ram which in the machine illustrated has a 10-in. stroke, is double-acting and provision is made to control the movement in either direction at all times as well as preventing overstroke. A screw stem stop and release valve is provided ordinarily, but a single lever operating valve can also be supplied.

A pump can be employed to provide the power which, in the case of the machine illustrated, is 18 tons at a pressure of 1500 lb. per sq. in. and 20 tons at a pressure of 1750 lb., although an accumulator is the source of supply recommended by the builder.

The machine can be built with the axes of the rollers and the ram all parallel as illustrated, or with the ram axis at right angles to the rollers. The weight of the machine is 750 lb.

Buying Munitions in Canada

Sir Thomas White, Minister of Finance, Ottawa, Ont., has arranged to make a further advance of $75,000,000 to the Imperial Government to be used for the purchase of munitions and supplies in Canada. The advances will be made at the rate of $25,000,000 a month during June, July and August. For a certain type of shell the British military authorities principally depend upon Canada's industrial establishments, whose output has contributed in no small measure to the recent successes at the front. These munitions can be purchased in the Dominion only, if Canada provides the money by way of loan to the Imperial Treasury. Up to date, the Dominion Government has found $250,000,000 and the banks of Canada $100,000,000 for war purposes. The credits now established by the Government insure continued munition orders for months to come.

The Association of National Advertisers, Inc., has issued a very interesting statement showing that advertising is not as expensive as is generally supposed. The cost of advertising of some leading advertisers is given as follows: Leading paint manufacturers, 3½ per cent of total sales; leading automobile manufacturers, 2 to 3 per cent; prominent department stores, 3 per cent.

Government to Buy British Machinery

Nearly $10,000,000 Worth for Manufacturing Enfield Rifles—Differences of British and French Guns and Ammunition

WASHINGTON, July 2.—The War Department has perfected plans for purchasing from the British Government approximately $10,000,000 worth of machinery for the manufacture of the Enfield rifle, with which to equip the new National Army to be sent to France. This machinery is now installed in several private plants in this country, having been built to the British Government's order more than a year ago and utilized in turning out a large number of Enfields for the equipment of the British forces on the western war frontier. This announcement, which the correspondent of THE IRON AGE is able to make on the authority of the Ordnance Bureau, serves to explain Secretary of War Baker's recent communication to the Speaker of the House of Representatives urging an appropriation of $9,500,000 "for the purchase or manufacture of machinery and other facilities for the manufacture of rifles including the necessary buildings, etc.," and in which he said that "the imperative necessity for the submission of this estimate arises from the fact that there is no other way than by the procurement and use of this machinery by which the forces it is contemplated to raise in connection with the European war can be armed at the proper time."

Why Springfield Rifles Are Out of the Question

This interesting incident serves again to illustrate forcibly the disastrous folly of the policy pursued by Congress during the past three years in ignoring the reiterated recommendations of War Department officials for generous appropriations for the purchase of gages, jigs, dies, automatics and other equipment to be installed in private plants to fit them up for the manufacture of service rifles. Under pressure from a small contingent in both houses, influenced by certain labor leaders who desire to expand the arsenals so as to provide a maximum amount of employment under the superior labor conditions existing therein, Congress systematically ignored these recommendations, yielding only when it was too late to make any substantial progress in purchasing and installing the desired machinery and devices. When the declaration of war came, therefore, the War Department was reduced to the humiliating expedient of abandoning its long cherished project of arming its forces with Springfield rifles, believed by American ordnance experts to be superior to any small arm in the world, and to provide for the equipment of a large part of the army with Enfields. As the use of the Enfield rifle was never contemplated the arsenals are without equipment for its manufacture and as the private plants have never been fitted up for the production of Springfields the output of the arsenals cannot be supplemented by contracts. Thus the Ordnance Bureau must utilize two types of rifles, and in order that the ammunition may be interchangeable—an absolute essential under service conditions—it has been obliged to provide for the rechambering of all the Enfields manufactured to reduce them to the Springfield caliber.

Great Britain's Better Policy

The course pursued by the British Government under similar circumstances is in marked contrast with the policy of the American Government as dictated by Congress. Immediately after the outbreak of the war with Germany contracts were placed in the United States for a large number of Enfield rifles at prices which included liberal allowances for the installation of equipment for their manufacture and for the amortization, in whole or in part, of the plants engaged in making the arms. At that time the facilities for the production of gages, jigs, dies, etc., were not fully engaged and as a result within six or eight months complete equipment for making the Enfield rifle was in place. Under the terms of some, if not all, of these contracts, the equipment became the property of the British Government and it is a part of these installations that the War Department is now proposing to purchase. It may be assumed that the plants in which these special installations have been made will not delay work upon the orders of Enfields for the National Army until Congress appropriates the money requested by the Secretary of War, but it is understood that the orders given by the War Department are conditioned upon the ultimate acquisition by the United States Government of such of the equipment employed as now belongs to Great Britain.

Features of British and French Guns

The Secretary of War has forwarded a letter to the Senate in compliance with a resolution passed by that body on June 15, in which he supplies some exceedingly interesting information with reference to the difference in types between the rifles, machine guns, field artillery and ammunition therefore, of the United States Army and those of the English and French Armies. This information will be of special interest to manufacturers who are following the development of the Government's project for equipping private plants for the manufacture of arms and ammunition of all calibers. The Secretary's communication, which is in the form of a series of questions and answers, is as follows:

First question. Has the British Enfield rifle been adopted for the American Army, and, if so, are such rifles being chambered so as to fit the American type of rifle cartridge?

Answer. It is intended to retain the American rifle of the model of 1903—sometimes called the "Springfield rifle"—for the use of the United States troops, and to increase the number available as rapidly as the manufacturing capacity of the two Government armories, at Springfield and Rock Island, will permit. The 500,000 and more of these rifles available for use in the war with Germany which are on hand in the United States, and over 200,000,000 of ammunition therefor, will thus be fully utilized. Because troops will probably be raised faster than they can be supplied with rifles of the model of 1903, with the above stated production, Enfield rifles of the model of 1914, manufactured in the United States, with different chambering and other modification to fit them to use the regular United States ammunition, will be newly made by the three establishments in this country which have made them for England, and used to supplement our own supply. We shall thus probably have two models of rifles in the field, but, and much more important, we shall have only a single model of ammunition, so that there will be no danger of confusion of ammunition supply.

Second question. Are machine guns for the use of the American Army using the same type of rifle carriage as the army rifle used by the American Army?

Answer. Yes.

Third question. Do the American cartridges for use in rifles and machine guns differ in size or otherwise so as to prevent their being used in the rifles and machine guns of the English or French? If so, what is the character of the difference and what advantage is gained thereby?

Answer. The American cartridge for use in rifles and machine guns cannot be used in the rifles and machine guns of either the English or French. As the English and French cartridges differ from each, the American cartridge would have to differ from at least one of them. Aside from the difference in dimensions, the American cartridge is a rimless cartridge, while the British and French cartridges are rim cartridges. The use of the rimless cartridge minimizes the risk of jamming in the magazine, and it is otherwise superior to the rim type.

Fourth question. To what extent does the field artillery of the American Army differ in caliber and character of ammunition used from that of the French and English armies?

Answer. In the field artillery of the American Army are cannon of somewhat similar calibers to those used in the French and English armies. The field artillery of these two armies, even the cannon of approximately the same caliber,

differs materially in the size of the chamber, muzzle velocity, weight of projectile, and type of fuse; that of the American Army would therefore necessarily differ from one or the other.

Fifth question. Can the ammunition of the English or French armies be used in the field artillery of the American Army?

Answer. The ammunition of the English or French armies cannot be used in the field artillery of the American Army.

Sixth question. If the American ammunition for rifles, machine guns and field artillery is not interchangeable for like British or French guns, what advantage is gained by having it differ from that of the English or the French Army?

Answer. The ammunition for rifles, machine guns and field artillery of the American Army, like that of the English and French armies, is the result of development along independent lines, the type of one country usually having been fully developed and in process of manufacture before the details of that of another country became known. In case of an enemy this lack of interchangeability of ammunition may be of material advantage, but in case of an ally it is a decided disadvantage. With reference to the present situation, it would be highly advantageous if our ammunition were interchangeable with that of those allies with whom our troops will directly operate, and with whom they could share common sources of supply. For operating with the French the disadvantage of not having our rifles and machine guns fitted for the English ammunition is small, and is more than counterbalanced by the ability to use the quite material supply of rifles and ammunition on hand, as set forth above in the answer to the first question. The French rifles and machine guns are not, and have not been, manufactured in this country; hence, through lack of manufacturing facilities, the question of the use of the French ammunition for rifles and machine guns could not be considered. With respect to artillery ammunitions, it may be stated that the present plans contemplate the eventual use of ammunition of the French type for most of the calibers, which the conditions of supply and manufacture render practicable.

Supply of Automobile Trucks Ample

The supply of military trucks necessary for the new army will be ample, according to the June issue of the *Bulletin* of the Society of Automotive Engineers. This was demonstrated by the fact that the 73 truck makers who submitted bids to the Government early in June pledged that they would produce over 100,000 trucks within a year, whereas it is unofficially estimated that not over 42,000 trucks will be required for the first army of 1,000,000 men. The Government has heretofore given assurance that there will be no necessity to commandeer private trucks, and so hamper industries, but the present bids indicate that not only will the taking over of private trucks not be necessary, but in addition to the war demands there will be practically as many trucks remaining for commercial use out of the 1918 production as were sold to the industries during the present year, provided sufficient material for the whole production is forthcoming. There will be enough trucks to supply the army and industries as well.

Buildings for Cantonments

The Trussed Concrete Steel Co., Youngstown, Ohio, will furnish large quantities of its products for the cantonments, to be built by the Government as training quarters. This company manufactures buildings, which have proven very satisfactory for Government purposes. Owing to the nature of their construction, these buildings can be made almost any length desired, and can be used for officers' headquarters, supply buildings, barracks, and the numerous structures which will form part of a camp.

That metals such as nickel or cobalt can be hardened by the addition of zirconium is the claim in a patent (U. S. 1,221,769) granted to Hugh S. Cooper, Cleveland. An alloy of 2 to 10 per cent zirconium and the remainder nickel is stated to take a fine cutting edge. With 8 to 15 per cent zirconium and the remainder nickel or cobalt the melting point is decreased below that of nickel and the electrical resistance increased. With 16 to 30 per cent zirconium the hardness is greatly increased and the alloy is useful for cutting tools.

England's Need of Copper

Discussing the need of copper in England, the London *Ironmonger* of June 9 says editorially:

"When will manufacturers be allowed more copper for the carrying on of private industry? There is plenty of copper in the United States, and the space required for so much of it as would set most of our private engineering trade on its feet again would make no practical difference to the Atlantic transport problem. Efforts are being made to secure to the cotton trade a sufficiency of its natural aliment; and one-tenth or perhaps one-twentieth of the shipping space required for cotton would solve the copper difficulty.

"There is little room for doubt that enough copper is now being produced to keep going all the metal and mechanical industries outside the Central Empires, besides satisfying the war requirements of the Allies, and if that surmise is correct the time has come to press this fact upon those in authority. Much wealth is being lost through the holding up of such a great part of our engineering industry, and this at a time when the nation should be earning and saving every penny it can make, for the apparent prosperity the industrial nations are enjoying is mostly an illusion. We are living on our hump, like the camel, and our hump is getting small. Hard times are in store for the world, and every measure that tends to the restriction of trade will aggravate that hardship.

"The plea for more copper is only one of many that might be put forward in the metal trade. The supply of lead also calls for serious consideration by experts, and in a comparatively short time there may be need to plead the cause of consumers of foundry iron. Man does not live by war alone. The country has to live through the war and will have to live when peace returns, and it can live only by productive industries and by commerce."

Women in the German Metal Trades

Women now employed in the German metal industries number 266,530, compared with 63,570 before the war, is a statement in the London *Ironmonger* of May 26, 1917. In the section of the industry devoted to war materials the growth is from 35,425 to 227,186. Most of the war work on which women are engaged is described as too hard, and physically harmful for them. Only in one-fifth of the works are the regulations protecting women workers in force. The working day is long; a week of 60 hours is not uncommon, while Sunday work and overtime bring up the working week for several thousand women to over 70 hours. In 364 works 34,742 women work on Sundays. Of the total number of women coming under review, 81,233 worked on time wages and 96,480 at agreed rates. Only in 278 factories did the women receive the same pay as the men. Time wages varied from 11 pfgs. to 65 pfgs. per hour. (= 1¼d. to 8d.); piece workers earned from 16 to 75 pfgs. per hour (= 2d. to 9d.). Daily piece wages ranged between 2 m. and and 10 m.; daily time wages between 1.20 m. and 7.50 m.

Edgewater Steel Co. Additions

The Edgewater Steel Co., whose plant is at Oakmont, Pa., about 10 miles from Pittsburgh, which now has one 25 and one 75-ton open hearth steel furnace, is adding a third 75-ton furnace, which will be completed in about 60 days. At present this company is making ingot molds, and also open hearth steel ingots, 20x22 in. square and 6 feet long, which it is furnishing to other concerns for re-rolling, and is also making a full line of steel castings up to 25 tons in weight. However, the company is installing as rapidly as possible under present conditions, equipment for the manufacture of locomotive and car wheel tires, rolled steel wheels for passenger and freight service, roll shells, ring dies, turbine rings and gear rims. These products, together with steel castings, will be the output of the company when the equipment now being installed is all in place and ready for operation.

Exporters Discuss Post-War Prospects

Metal Trades Day at Springfield Industrial Exposition and Export Conference Draws Large Gathering—Experts Analyze the Future of Machinery and Metal Goods in Foreign Fields

What is intended to be the first of an annual series of industrial expositions and export conferences was held at the Eastern States Exposition Grounds, Springfield, Mass., June 23 to 30. Thursday, June 28, was set apart as "Metal Trades Day" and the morning conference devoted to machinery and metal goods was presided over by Charles E. Hildreth, president Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., and general manager of the National Machine Tool Builders' Association.

The subject of the first paper, read by C. O. Smith, sales manager Norton Grinding Co., Worcester, was "After the War—What of Machinery Export?" "American Tools in Foreign Markets" was discussed by Oren O. Gallup, export manager Simonds Mfg. Co., Fitchburg, Mass., and Adolph W. Gilbert, president Chapman Valve Mfg. Co., Indian Orchard, Mass., had as his subject "Metal Fittings in Overseas Markets."

Over 400 members of the National Metal Trades Association and representatives of Employers' Associations in New England attended the session and enjoyed a sheep bake at the luncheon hour.

Each day of the conference was set apart for specific industries and many of the speakers at the various sessions were recognized leaders in their respective industries. Monday was "Paper Day"; Tuesday, "Textile and Financial Day"; Wednesday, "Leather and Rubber Goods Day"; Thursday, "Metals Day"; Friday, "Office Appliance Day"; and Saturday, "Chemical Day."

The chairman of the general committee of the Conference was Frank H. Page, president of the National Equipment Co., Springfield, and a number of men well known in the steel and machinery field were on the Advisory Council, among them the following: Walter H. Fish, manager General Electric Co., Lynn, Mass.; Louis A. Collidge, treasurer United Shoe Machinery Corporation, Boston; E. M. Herr, president Westinghouse Electric & Mfg. Co., New York; W. W. Nichols, Allis-Chalmers Mfg. Co., New York; Maurice Coster, managing director Westinghouse Electric Export Co., New York; Charles M. Muchnic, vice-president American Locomotive Sales Corporation, New York; A. L. Humphrey, president Westinghouse Air Brake Co., Pittsburgh; Winchester Bennett, president Winchester Repeating Arms Co., New Haven, Conn.; F. J. Kingsbury, Bridgeport Brass Co., Bridgeport, Conn.; and Charles Glover, Corbin Screw Corporation, New Britain, Conn.

Excerpts from the principal papers of "Metal Trades Day" follow.

After the War—What of Exports?

BY C. O. SMITH

Sales Manager, Norton Grinding Co., Worcester, Mass.

Up to the present time, England and Germany have been the most potent and, I might almost add, the exclusive competitors of America in the machinery market. It is a reasonable premise that the nations now at war will later, in large measure, co-operate with their present allies along economic lines. Further, it is not unreasonable to expect that, for a considerable period at least, the products of Germany will find little if any favor among the so-called Allies, with the possible exception of Russia; it would thus appear that for some time to come we may reasonably anticipate having only England as a serious competitor; later, we may expect to see Canada a considerable factor in the machine tool industry.

Although the enormous demands on the resources of Europe have naturally encouraged in England the highest possible development of those classes of machinery which have a direct bearing on the war, the probability is somewhat remote that there has been a similar concentration of effort on automatic and other types of machines which until within a comparatively few years were peculiarly American. Therefore, in many of these lines, especially where we are economically manufacturing in large quantities, we may anticipate finding ourselves occupying a commanding position in the industry.

Attitude of Labor

Another factor which will loom large in our machine tool destiny is the probable attitude of foreign labor. The coming of peace will find Europe's labor supply seriously depleted; this shortage, combined with the assured high cost of living, an excessive burden of taxation to meet interest on national debts, and replace the wastage of war, together with the spread of socialistic doctrines, will necessitate very material advances in the remuneration of European labor as compared with wages prevailing prior to the war, whereas unless the war continues beyond our reasonable expectations, there will not be a proportionate advance in our labor costs. Therefore, while we may not be justified in looking for a reduction in wages in this country for a number of years, we are practically assured that wages abroad will so increase as to materially aid our export business.

Let us now consider what may be the field for our product. Confining ourselves to the nations with which we are allied, we can safely count on England, with her industries intact, being in position to produce all the equipment she requires with the possible exception of such automatic or special purpose tools as can be more favorably purchased in America. On the other hand, Belgium, essentially a manufacturing country, has been laid waste. The machinery that has not already been removed to Germany and Austria, and thus will probably never be recovered, has already been or doubtless will be totally destroyed as the German army is withdrawn. A similar condition prevails in Northern France as well as in the manufacturing districts of Poland. Further, if the war continues, as has been variously predicted, from one to five years, it is quite reasonable to assume that a large part of the equipment in munition factories of England, France and Italy will be fit only for the scrap heap. I mention this because frequent statements are heard to the effect that after the war the extensive equipments of munition factories will be available for legitimate manufacture, thus creating a surplus which will require many years for its assimilation. In some classes of work, this second-hand machinery can be advantageouly employed, but for better grades such as precision tools, automobiles, motor trucks, aeroplanes, engines, etc., the most up-to-date machinery will be absolutely essential to meet the intense competition which will surely follow the return to peace.

Labor Saving Equipment

This reasoning logically leads to the conclusion that a vast amount of labor saving equipment such as America is most efficiently prepared to furnish will be required if the above sections of Continental Europe are to be restored to their former industrial activity, which restoration seems a prime necessity, if they are to enter the coming economic struggle with any degree of success.

Should the present crisis continue till we as well as our allies are financially exhausted, we may well contemplate the future with deepest concern; recent developments, however, would seem to indicate that, while our people must dig deep into their resources before

the desired end is attained, our country will still be capable of supplying the sinews whereby the ravaged countries shall again be made habitable and prosperous. Indications are not lacking that Europe contemplates an eventual industrial development far beyond that attained prior to the war, thereby utilizing a large proportion of that great army of metal-workers which during the present crisis is so valiantly supporting the armies at the front.

Heavy purchases of machinery have been and are being made, largely for use after the war and providing for production far in excess of what has been a normal output; this applies particularly to the automobile and motor truck industries. This may very properly be construed as a step in anticipation of a serious shortage in transportation facilities as one of the outcomes of this war.

Assuming that the views expressed in this paper as to the immediate future in Europe are far too optimistic, are there other fields wherein we may hope to discover and devolp an outlet for our surplus product? The answer is most emphatically, yes.

Canada our northern neighbor has but recently experienced the prosperity which comes from intensive industrial effort; nothing short of continued development along industrial lines will satisfy these "Yankees of the North." South America, which in the past has purchased so heavily of German goods, has been for three years free from Germany's direct commercial and financial influence and intercourse with other European sources of supply has been seriously curtailed.

The door has thus been thrown wide open to American enterprise, and as many of the South American states are co-operating with us in the world war, we have reason to believe this channel of trade will remain open to us. Just how long depends almost entirely on the efficiency with which we marshal our forces in the effort to win that which is logically our birthright. There is ample evidence that the trail of this development is already being blazed. Large orders for machinery have recently been placed in New York and export offices are continually receiving machine tool specifications of large proportions.

This demand will continue and probably increase in volume. It therefore behooves us to put our shoulder to the wheel and so far as export business is concerned, let our slogan be "the Americas for Americans."

Progress Being Made

Compared with the program developed by Germany the export business of this country has been conducted in a most inefficient manner, as only recently have our bankers given American exports the attention they deserve. Progress is now being made in the co-ordination of industrial and financial interests which bid fair to introduce thorough and effective co-operation which will bear comparison with the system, which prior to the war, was so efficiently fostering Germany's foreign trade.

This statement refers particularly to South America, where when suitable arrangements have been made for accommodating the customer with the long credits to which he has been educated, and the proven merit of our goods has secured the confidence and support of the market, American business ability may safely be entrusted to so cement this good-will as to make our export future reasonably secure.

Humanity is much the same the world over; the foreign user of machinery will, with very few exceptions be loyal to his source of supply so long as he at all times is given value received in the goods purchased and the attention necessary to produce the results to which he is entitled.

American Tools in Foreign Markets

BY OREN O. GALLUP

Export Manager, Simonds Mfg. Co., Fitchburg, Mass.

As one investigates the hardware markets of Europe, of South America, of Australasia, of any part of the world in fact, New England tools of quality and reputation are found. Not only are these in stock in the stores but they are giving efficient and satisfactory results in actual work and in competition with the makes of all foreign countries. A careful study of manufacturing and economic conditions shows that those manufacturers who have a steadily increasing export trade are doing this work because they have foresight, because they can see that later when export trade is essential to the prosperity of their business, these foreign markets cannot be won in a week, a month or even a year.

Those of us who have been regularly competing in foreign fields are of course planning for the future, working out definite policies for increasing the sale of our products in world markets. But how about the manufacturers who have never taken any interest in this class of trade? These firms are doing export business now. They have had it forced upon them by conditions existing. Of course, much of this business is handled by New York exporters, so that the manufacturer has been able to receive any terms he desired to dictate and has been able to avoid any of the details usually so necessary to the proper conduct of foreign trade. Nevertheless it is export business. Demand and reputation are being established by the goods now being sent abroad under such attractive conditions. For these manufacturers, the war has accomplished the same results as several years of endeavor and expense have done for many of us in the past.

Trade in Competing Countries

Foreign markets can be divided into two general classifications—competing and non-competing countries. The former are those which actually manufacture goods competing with those you wish to sell. For hardware tools and steel products the competing countries are principally England, France and Germany. Can our tools be sold in these countries—the homes of our competitors? Most emphatically, yes. This is not an expression of personal opinion but a statement of fact. Go to these countries; look in the hardware, supply and ironmonger stores and see the quantities and different styles of American tools which are stocked and in demand. It will be a decided surprise to those whose impression of American commerce abroad is derived from the publications and preachings of your teacher and tourist critics. How has this sale and demand been created? Have American manufacturers met these extremely low prices of European manufacturers as always advised by our critics? In a few cases, yes. Some instances have been found where the American manufacturer has been able, through improved methods, use of automatic machinery, standardization of product and efficiency measures, to make his products at a price to compete against goods made by the low-priced European labor.

How to Meet Europe's Low Prices

To most of us, with our comparatively high costs of manufacture, it is a more difficult problem. How can we possibly meet these low prices? My answer would be—do not meet them. You can only do it by cheapening the quality of your goods, which is the last thing you should do. There is a better basis on which we can compete. If your products are higher in price, then make goods that will be worth more and give enough value for the higher cost to make it an object for the consumer to buy. Practically all the American tools sold in these "competitive countries" are high quality, high priced articles for which a demand has been created upon this basis.

Do not let "European low prices" frighten you in advance. They can only eliminate your product when your goods are only equal to the low priced goods manufactured abroad. Make your quality higher and your price fair and you have the same fighting chance to get business that you have in your domestic market. You have to work to maintain your business here and you

can rest assured that the export trade is not going to be handed to you without any effort on your part.

American Saws in Sheffield

Our firm has found it impossible to anywhere near meet the prices of European manufacturers, yet we are able each year to increase our business in the competing countries. As an example, consider the saw competition in England. There are congregated in Sheffield more than twice as many saw manufacturers as there are in our whole country. They manufacture at extremely low prices. To sell some in Sheffield is like taking coals to Newcastle. Yet we have sold and are regularly selling Simonds saws in Sheffield to users who are willing to pay double the Sheffield price for the increased results and efficiency procured from our goods.

If success can be obtained in these markets that are considered so difficult, then in the non-competing markets if we are not successful the fault lies with ourselves or our methods. Some of these markets are slower to respond to quality goods than others but all will respond in time to a well planned and consistently handled selling campaign.

Europe Our Largest Customer

In considering export trade there has been a great tendency in our country to think only of Latin American trade. Conceding the importance of this trade and the need of its careful consideration, I call your attention to the fact that Europe has been, is, and will be for a long time our leading customer for tools and hardware. Even outside of the competing countries, consider the markets available. There is Russia, an immense consuming country, the greatest undeveloped section of the world, already consuming great quantities of our goods—a constantly increasing business. The possibilities of this market alone are wonderful.

Then there are the Scandinavian countries, Norway, Sweden and Denmark. With these should be included Finland, which, while politically part of Russia is geographically a Scandinavian country. These countries have many skilled and educated workmen who naturally demand quality tools. Then, too, there are in these Scandinavian countries many workmen who have worked at their trade in our own country and in returning to their native land continue to buy the tools which their experience has taught them to be best for their work.

Holland is so situated in relation to the competing countries that the same policies and methods adapted for this group of countries should be used in working up a considerable business. In fact, you must consider that the various countries of Europe bear the same physical relations to each other as the different States of our own country. These countries are comparatively small in area and very easy of access of each other to such an extent that the European manufacturer in considering his export trade classifies his continental trade as being entirely a separate and distinct proposition from the overseas trades.

In the southern part of Europe we find Spain and Portugal somewhat slower to respond to the benefits of high quality, high priced goods than some of the other sections. Our progress in these countries is quite slow, but there has been a steady increase from year to year in the volume of business received, which would indicate that gradually our high quality goods are becoming established and a sale and demand created.

Displacing German Products

In Italy the demand for goods of quality was steadily increasing before the war. Germany, however, had a very firm hold upon certain classes of the hardware and tool trade which made aggressive selling methods necessary to procure any volume of business. The war, of course, changed conditions and eliminated German goods. The results have been that very large quantities of American tools and hardware of the highest squality has been purchased and consumed in Italy during the past months. The users have become educated to the advantages of our superior articles and it is my personal opinion that a very large percentage of this trade now being worked up will be retained by our manufacturers if the business is properly handled upon a basis which will give the buyers confidence in us.

In Italy as well as in Greece the returning emigrant is also a factor in the demand for American tools. Of course, in Greece the obstacles to shipping and interchange of commerce have interfered greatly with the business obtained. As these conditions improve, and present indications are that they will, a similar demand to that which has existed in Italy will be found and the same opportunity to establish a business that will last after the war.

If in the European market we can work up a successful export business in tools, hardware and steel products, there is no reason why we cannot be very successful in the other markets of the world, if we conduct our export business upon the proper basis. It has been shown, and the export figures issued by our Government will confirm, that our manufacturers have been more successful in Europe than any other market. To the manufacturer who has not been actively identified with export trade a consideration of these conditions outlined as regards the European trade will show that he is not justified in presenting as an excuse that he cannot compete with "European low prices." Except in a few individual cases the American tools and hardware can be sold in Europe or any other market if the selling effort is based upon the same study of local conditions and the use of the same common sense in business methods which you have applied in connection with your domestic efforts.

Proud as I am of American export trade and the fact that American goods are becoming so favorably known for their quality and reliability in all parts of the world, I am not making a plea for the American manufacturer to enter the export trade for patriotic reasons alone. It is a duty which you owe the economic development and prosperity of our great country. It will be a necessity for the future growth of your business and even the maintenance of present production. Plan and prepare now.

Metal Fittings in Overseas Markets

BY A. W. GILBERT

President Chapman Valve Mfg. Co., Indian Orchard, Mass.

As the United States possesses the greatest mines in the world, the greatest inland transportation system in the world, handling freight at the least cost per ton per mile, as we possess the wealth and inventive genius and the greatest proportion of high-powered mechanics, it would seem that our problem of supplying foreign countries with our product of metal fittings resolved itself down to three factors—labor, sea transportation and finance. There is no question that we can make pig iron at the furnace cheaper than it is made in any other country in the world. There is no question but that we make ingot copper cheaper at the smelter than any other manufacturing country. There is no question that we can transport either of these to a seaport or to large manufacturing centers more cheaply than it can be done in any other country.

There is another factor not so commonly appreciated, and that is that our factories in this country have a much larger percentage of what we might term high powered and high class foremen and managers. These men are constantly studying and applying new and efficient methods of factory practice. Their intelligent work, together with the increase in average intelligence of the worker, brought about by the liberty of individual action and thought, made possible by our free democracy, enables American factories to produce greater tonnages and greater values per man employed than are the case in any other country.

The Ocean Problem

As to the lack of merchant marine, which has been a national handicap, I think we need have no fear for

the future. Ever since this great war began, the actions of the fighting nations have made more and more certain the fact that in all future years the United States must and will occupy a prominent if not the most prominent place in sea transportation. More ships are now building in this country than ever. Still more orders for ships to be built here are awaiting facilities. Events since Aug. 1, 1914, warrant our feeling sure that the United States will have the largest and most efficient merchant marine operating to overseas markets of any country in the world with the possible exception of England, and we shall never again consider England and France as foreign countries.

Foreign Labor Costs to Be Higher

A second handicap of the United States has been the high cost of labor. In view of the growth of democratic ideas throughout Europe, it is inconceivable that the manufacturers of this country will ever again contend with the former low wage scale or the long hours in those countries; but they will have to contend in a more or less remote future with added intelligence of foreign factory labor, since democracy tends to raise the brain power of the individual. Another feature in the competition of foreign factories is the decreased supply of labor because of death and incapacity due to the war. By some that is considered a very great factor; others minimize it because of the increase of female labor and the decrease of immigration. The question of immigration is an uncertain factor and admits of wide discussion; but the question of greater democracy, of greater power and freedom of the individual and of better compensation and living conditions for the worker does not admit of discussion.

I want to impress upon you what I firmly believe—that this war will lay forever the great bugaboo of cheap foreign labor and long working days in foreign factories; but I warn you that in laying this danger you cause to rise out of the great struggle a new danger to factories in this country seeking a foreign market for metal fittings. You bring in as your competitor the power arising from the increased intelligence of the high powered and the low powered worker, which will be backed and urged on by extreme necessity.

American Advantages in Export Trade

With the advantage of higher intelligence in American factories, every large or small concern in metal fittings that I know of in this country, that has consistently and persistently sought foreign markets, has found this asset great enough to assure success. As intelligence increases in foreign factories, it becomes more necessary than ever for manufacturers of metal fittings in this country to use all energy and perseverance in obtaining and retaining a place in world markets. We must have organization and co-operation. That does not mean co-operation and organization among manufacturers alone. It means intellligent co-operation and organization between employer and employee—a recognition on the part of the employer of the position and the difficulties of the employee. The time is past when the son who inherits a mill property in New England also inherits the people working in the mall. The fact that many who inherited control of manufacturing property in New England acted as if they also inherited the workers has caused many a failure in business and today makes many New England mills afraid of competition in other States and abroad.

A third handicap we had before the war was lack of American banking and financial help in foreign markets. This has been largely overcome and such facilities are being rapidly increased. One American banking house alone within the last two years has established 39 foreign branches and is establishing others as fast as circumstances will permit.

Our Export Trade in Metal Fittings

Let me say a few words about what I know personally of foreign sales of metal fittings: I was intimately connected with the Fairbanks Company of New York from 1899 to 1909. During that time they sold Fairbanks scales all over the world. There was no corner of the world where they were unable to make sales. In the course of business they established stocks and branch houses in England and on the Continent, these houses being stocked almost exclusively with American metal fittings. When the war broke out in 1914, their house in Hamburg, Germany, was the most profitable business they had; they were selling American metal fittings in the heart of the German manufacturing district at a profit, although they were what might be termed middlemen.

When the war broke out in 1914, 25 per cent of the output of the immense Underwood typewriter factory in Hartford was being sold in the countries that entered the war. This business was built up by persistent and intelligent selling headed by John Underwood personally and supported by the magnificent factory conditions they have at Hartford.

The Singer Sewing Machine Co. for many years has enjoyed an immense trade in foreign countries.

The United States Steel Corporation, when the war broke out, was fast getting to a place of large importance in the steel markets of the world.

I had a friend who was located officially several years at one of the largest receiving ports in Russia, who advised me that from 20 to 80 per cent of the carrying capacity of every ship which arrived at that port from America was occupied by machinery made by the International Harvester Co.

Meeting German Competition in England

In the spring of 1915 our company sent a very bright young man to England, where we had made some sales in the many years preceding. He examined carefully the English market—the first time we had ever attempted such an examination. We found that there was a line of our material that had come into large demand in the previous ten years, which was not made extensively in England. German factories had covered the market and nearly all the valves of that line sold in England were brought from Germany. We found that at the prices prevailing in England before the war and at the cost of sea transportation prevailing between New York and London, our company could deliver this same line of valve in England and compete with German manufacturers. We were able to establish a very fine business in London and have recently developed a larger business in France, receiving large orders from that country at this time. This increase we attribute to war conditions in Europe, but nevertheless investigations we have made since the war began convince us that with an American owned merchant marine and under conditions of peace throughout the world and with banking facilities friendly to American manufacturers, we can compete with any prices that we are aware of at this time or that prevailed previous to war conditions, where shipments had to be made into other countries by our foreign competitors.

The Argentine Cast-Iron Pipe Contract

In the summer of 1915 we joined with the United States Cast Iron Pipe & Foundry Company in sending a very intelligent man to South America. This man was of Spanish descent and had spent nearly all his business years in the United States, and was thoroughly conversant with our conditions. He had spent two years in Havana in an important executive position. He understood the Latin language and the Latin people practically as well as the natives and in many ways he was most excellently equipped to enter the South American countries as a salesman. He reached Rio, Brazil, in December, 1915, and Buenos Aires in March, 1916. In October, 1916, he made a bid in behalf of the United States Cast Iron Pipe & Foundry Company for the delivery of 60,000 tons of cast-iron pipe, a contract that involved $3,500,000. He had English firms as his competitors. The bids were very close indeed; in fact, so close that the directors who had the awarding of the contract took a week or ten days to consider them. At the end of that time they awarded the contract to the United States Cast Iron Pipe & Foundry Company because the board figured that its bid was $60,000 less than the lowest English bid. I mention this fact to show how fair and honest the Buenos Aires board was in awarding to practically unknown parties on a $60,000

margin a contract which involved $3,500,000, whereas for years they had previously purchased all of this material from English firms.

Valve Contract Won by 1½ Per Cent

The same department in Buenos Aires was in the market for valves to be used in connection with the pipe they had purchased, and they issued their specifications in November for bids to be opened the last of February. At that time the company I represent was awarded the contract for about $200,000 worth of valves, the next highest bidder being only $3,000 above us. I give these figures and cite these circumstances because I want to impress upon you the fact that American manufacturers received the highest consideration without any influence political or otherwise being brought to bear upon the decision of the Argentine Department, and solely on the work and representation of one man, backed, however, by the helpful words and efforts of the Buenos Aires branch of the National City Bank of New York.

Our work in South America shows that the English people, backed, we believe, by the admiralty as long as they could give them any assistance in the way of sea transportation, have held on to their foreign markets with the utmost persistence and success.

The only reason we do not have a good business in Japan, Australia or China is that we have not made the necessary connections and given this business the necessary attention, as has been done for years by English and continental firms.

The foreign market cannot be used as a dumping ground with any success. You must not enter it because you have a surplus of manufactured product or a dull market at home and withdraw your selling organization when conditions change in this country. If you want the foreign market, you must seek it with the same persistence and honorable endeavor with which you seek your home market; and if you do this, you will be surprised at the business you will be able to build up in metal fittings.

Chromium, Copper and Nickel Alloys

"A Preliminary Study of the Alloys of Chromium, Copper and Nickel," by D. F. McFarland and O. E. Harder has been issued as Bulletin No. 93 by engineering experiment station of the University of Illinois, Urbana, Ill. The purpose of the investigation is stated as follows:

The growing interest in special acid-resisting alloys and the many uses found for them have stimulated both the search for efficient materials of this nature and the study of the causes underlying their inertness. The alloys developed by Prof. S. W. Parr for use in calorimeter construction have shown this quality of high resistance to corrosion to a marked degree. The almost perfect insolubility of these alloys in nitric and other acids seems to be conditioned upon a proper mixture of chromium, copper and nickel, together with smaller quantities of such added metals as tungsten or molybdenum. These additions have so marked an effect in improving both the acid-resisting properties and the casting qualities of the alloys that it has seemed desirable to study their effects more systematically in order that they may be used to the best advantage. The complexity of the mixtures used, however, has made the problem a very difficult one and has shown the necessity of first obtaining a more complete knowledge of the ternary alloys of chromium, copper, and nickel, and of the binary alloys of copper and nickel, copper and chromium, and chromium and nickel. With this information in hand it should be possible to understand better the effects produced by additions of a fourth metal.

Excellent photomicrographs appear, illustrating important points.

The Danville Iron & Steel Co., Danville, Pa., has been formed to succeed the Danville Foundry & Machine Co., and Miller & Curry, both of Danville. A general scrap iron business will be conducted in connection with the foundry and machine shop formerly operated by the Danville Foundry & Machine Co., and the manufacture of refined iron bars will be begun in the near future.

American Machinery in Russia

An American mechanic, who has spent three years in Russia, travelling and setting up machines over a large part of that country, and who has been in touch with many purchasers of American machines, makes the following report to Commercial Attaché William C. Huntington of Petrograd:

The machines that chiefly came under my observation were steam shovels, dredges, drag lines, and excavating machinery of all kinds. I have seen also tractors, of which there are many in Russia, and several cotton mills and air compressors of American makes. In most cases the purchaser was not satisfied with his machine. Sometimes the trouble was trifling and I was able to explain and adjust it in a very short time. In other cases it was serious because purchasers had not obtained spare parts, and it was very expensive and sometimes impossible to replace them in Russia. As a rule, the machine had been guaranteed to do a certain amount of work, but had fallen short in the performance because it had been operated by unskilled labor. The purchaser then thought the machine was no good. In one case I called on the agent who represented the American company and explained why the machine was not giving satisfaction. His reply was that the machine was all right when it was sold and the firm had nothing more to do with it.

American machines are new in Russia, and you cannot expect a man who has never seen a machine work to get good results. Sometimes 15 or 20 per cent of the purchase price is held back until the machines are properly demonstrated and in a few cases the last payment was never made because the machines did not do what they were guaranteed to do. If American manufacturers intend to introduce their machines in Russia, they should have representatives in the country who will not only sell the machines but will go around to see how they are working and give any assistance that may be necessary. It is essential also to keep a full supply of repair parts, as it is almost impossible to duplicate some parts, and the delay in getting them is a frequent cause of dissatisfaction.

Russia offers a large field for all kinds of excavating machinery. Railroads and canals are to be extensively developed. Irrigation and drainage work is only started, and there is an immense area to be improved in this way. In all this development work machinery will be used to a much greater extent than it has been in the past, because a shortage of labor is to be expected. Now is the time to advertise American machinery in Russia, and the best advertisement is a satisfied customer.

Chemical and Dye Concerns Amalgamate

The amalgamation of the coal-tar, color, intermediate and raw material manufacturing concerns of the Schoellkopf Aniline & Chemical Works, the W. Beckers' Aniline & Chemical Works, the National Aniline & Chemical Co., the Benzol Products Co. and certain plants and properties of the Barrett Co., the General Chemical Co. and the Semet-Solvay Co., under the title of the National Aniline & Chemical Co., Inc., has been accomplished. The capitalization of the new company will be 200,000 shares of 7 per cent preferred stock of $100 par value and 350,000 shares of common stock without par value. William H. Nichols of the General Chemical Co. is chairman of the board; J. F. Schoellkopf is president; W. Beckers, first vice-president; I. F. Stone, second vice-president and treasurer; C. P. Hugo Schoellkopf, third vice-president, and W. T. Miller, secretary. The company will manufacture and consume large quantities of benzol and toluol.

Will Rebuild Plant

The General Foundry & Mfg. Co., Youngstown, Ohio, states that its plant at Girard, which was recently destroyed by fire at a total loss of about $60,000, will be rebuilt on a larger scale as soon as the insurance is adjusted. The company will be in the market shortly for considerable equipment for its new foundry.

Last week, an ore bridge at the steel plant of the Youngstown Sheet & Tube Co., East Youngstown, Ohio, was destroyed by a tornado, and will be replaced at once. The bridge was about 100 ft. high and 327 ft. long. The company has two other similar ore bridges, and has not been seriously inconvenienced by the loss of the third one.

Government Control of Industries

Food Bill Changed to Extend Complete Regulation of Iron and Steel and Other Lines of Manufacture—An Amazing Program

WASHINGTON, July 3.—Under the deceptive guise of a bill to enable a proposed food administrator to secure the equitable distribution of the food supply of the country and to prevent its hoarding by speculators or the exaction of extortionate prices, a bill has been reported to the Senate and is now under debate in that body, which in certain respects is the most extraordinary legislative measure ever presented for the serious consideration of Congress.

Dragnet Control of Leading Industries

Designed at the outset to deal solely with food products, it has been amplified so that it places within the hands of the President of the United States, or of any agent or agency he may designate, absolute power to regulate in all particulars the great industries engaged in the production of iron and steel, copper, lead, coal, petroleum and all other fuel, lumber, fertilizers, vegetable fibers used in the manufacture of binding twine and for other purposes, farm implements and machinery. Incidentally, the measure carries a "rider" imposing prohibition in the most drastic form upon all the people of the country, forbidding the manufacture not only of all forms of distilled spirits, but even of malt liquors carrying a minimum alcoholic content.

Under ordinary conditions such a bill would stand little chance of receiving any attention at the hands of either house, but under existing conditions it is quite within the bounds of possibility that it will be accepted by both houses and become a law within the course of a few days. That it will encounter vigorous opposition goes without saying, for it has already been sharply attacked by some of the ablest men in the Senate, but no one here ventures a prediction as to the form in which it will ultimately become a law, although its passage is generally conceded.

The basis of this extraordinary measure was a bill framed by administration officials, introduced in the House by Chairman Lever of the Committee on Agriculture, and passed by the House after brief debate. It provided for Government control, for purposes of equitable distribution, of foods, feeds, fuel and articles required for their production, these things being denominated "necessaries" as a justification for the proposed delegation of control to the Executive. After passage by the House the bill was forwarded to the Senate Committee on Agriculture and Forestry, by which the measure was practically rewritten by a handful of Senators posing as the special friends of the farmer. The category of things to be controlled was expanded by this committee to include "foods, feeds and containers therefor, fuel, including petroleum and its products, iron and steel and their products, copper and its products, hemp, jute and sisal and their products, lead, timber, lumber, farm implements and machinery, and fertilizers." These articles, by the terms of the bill, are to be brought under "governmental control during the war" and the President in the exercise of this control "is authorized to enter into any voluntary arrangements or agreements, to create and use any agency or agencies, to accept, in his discretion, the services of any person without compensation, to co-operate with any agency or person, to utilize any department or agency of the Government, and to co-ordinate their activities."

Steel Manufacturers Barred

Having thus clothed the President with broad powers which he may delegate to any one in his discretion, the Senate Committee proceeded to eliminate from the Council of National Defense and generally from the councils of the Government practically all the prominent industrial leaders who have so freely given their services to assist the Administration in meeting and solving the grave business problems resulting from the war. This has been accomplished by the incorporation in the House bill of the following provision:

> Sec. 3. That it is hereby declared unlawful for any person acting either as a voluntary or paid agent or employee of the Government in any capacity, including an advisory capacity to any commission, board, or council of the Government, to procure, attempt to procure, or make any contract for the purchase of any supplies for the use of the Government either from himself, from any firm of which he is a member, or corporation of which he is an officer or stockholder, or in which he has any financial interest. Any person violating this section shall, upon conviction thereof, be punished by a fine not exceeding $10,000, or by imprisonment for not more than five years, or both, in the discretion of the court.

By another section of the bill a new series of criminal offenses has been created far more comprehensive than those sought to be reached by the Sherman anti-trust law or any of the acts amendatory thereof. This section is as follows:

> Sec. 4. That it is hereby made unlawful for any person wilfully to destroy any necessaries for the purpose of enhancing the price or restricting the supply thereof; knowingly to commit waste or wilfully to permit preventable deterioration of any necessaries in or in connection with their production, manufacture, or distribution; to hoard, as defined in section six of this Act, any necessaries; to monopolize or attempt to monopolize, either locally or generally, any necessaries; to engage in any discriminatory and unfair, or any deceptive or wasteful practice or device, or to make any unjust or unreasonable rate or charge, in handling or dealing in or with any necessaries; to conspire, combine, agree, or arrange with any person (a) to limit the facilities for transporting, producing, harvesting, manufacturing, supplying, storing, or dealing in any necessaries; (b) to restrict the supply of any necessaries; (c) to restrict distribution of any necessaries; (d) wilfully to prevent, limit, or lessen the manufacture or production of any necessaries in order to enhance the price thereof, or (e) to exact excessive prices for any necessaries. Any person who violates any of the provisions of this section shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined in a sum not exceeding $10,000, or by imprisonment not exceeding two years, or both.

In considering the foregoing section and especially those provisions relating to the exaction of excessive prices, etc., it should be borne in mind that the House bill contemplated only food products, while the Senate measure, as already stated, has been broadened in scope to include both raw materials and finished products of nearly all the leading industries of the country.

Exemption to the Farmer

For the purpose of enabling the President to "control" the necessaries embraced in the provisions of the bill he is authorized by the Senate measure to adopt a system of licenses which, after a proclamation to that effect, will be required for "the importation, exportation, manufacture, storage, mining, or distribution" of any of the enumerated articles. No person may carry on business with reference to any of these articles

unless he shall first secure a license and whenever the President shall find that any storage charge, commission, profit, or practice of any licensee is unjust, or unreasonable, or discriminatory and unfair, or wasteful," and shall order such practice to be discontinued, the licensee must obey such order or render himself liable to a fine of $5,000 or imprisonment for not more than two years, or both. Realizing the drastic character of the provisions of this section the committee has thoughtfully provided an exemption for farmers, as follows:

> Provided, that this section shall not apply to any farmer, gardener, co-operative associations of farmers or gardeners, including live stock farmers, or other person with respect to the products of any farm, garden, or other land owned, leased, or cultivated by him, nor to any retailer with respect to the retail business actually conducted by him.

For the purpose of the proposed law a retailer is deemed to be a person, co-partnership, firm, corporation, or association not engaging in the wholesale business whose gross sales do not exceed $100,000 per annum.

Hoarding Penalized—Unless by Farmers

Prohibition against the hoarding of 'necessaries' is held by the Senate bill to have been violated when they are "held, contracted for, or arranged for by any manufacturer, wholesaler, retailer, or other dealer in a quantity in excess of the reasonable requirements of his business for use or sale by him for a reasonable time, or reasonably required to furnish necessaries produced in surplus quantities seasonably throughout the period of scant or no production; or withheld, whether by possession or under any contract or arrangement from the market by any person for the purpose of unreasonably increasing or diminishing the price." By another proviso, however, "any accumulating or withholding by any farmer, gardener, co-operative association of farmers or gardeners, including live stock farmers, or any other person, of the products of any farm, garden, or other land owned, leased, or cultivated by him shall not be deemed to be hoarding within the meaning of this act."

Comprehensive authority is granted the President by the Senate bill to requisition all the "necessaries" covered by the measure "to the support of the army or the maintenance of the navy or any other public use connected with the common defense, the compensation therefore to be determined by the President. In the event of dissatisfaction on the part of the owner of requisitioned supplies the President is authorized to pay 75 per cent of the tendered price, whereupon the owner will be entitled to sue the United States to recover any additional amount claimed.

President May Take Over Plants

But broader powers are conferred upon the President than merely to requisition material. Under the terms of a provision added by the Senate Committee, whenever he shall find it necessary to secure an adequate supply of any of the articles enumerated in the bill for the support of the Army or the Navy, or for any other public use connected with the common defense, he is authorized to take over any factory, mine or other plant "and to operate the same." This section of the bill goes much further than any legislation heretofore favorably acted upon by either house. A proposition originating in the House Naval Committee empowering the President to take over shipyards and draft their employees was promptly abandoned because of a strong protest that arose from the labor leaders. The new bill, however, authorizes the President "to prescribe such regulations as he may deem essential" for carrying out the purposes of the act, "including the purchase, sale or other disposition of articles used, manufactured, produced, prepared or mined" in any establishment taken over "and the employment, control and compensation of employees." Another proviso thoughtfully inserted gives to wage earners dissatisfied with the rates of pay fixed by the President "the right to have the reasonableness of such wages reviewed and determined by the Board of Mediation and Conciliation created by the act of July 15, 1913.

Penalties for Manipulation

Additional criminal offenses are created by a further provision of the bill and are made punishable by fines not exceeding $10,000 or imprisonment for not more than four years, or both. These offenses are defined as follows:

> That undue enhancement or fluctuation of prices of, or injurious speculation in, or unjust market manipulation or unfair and misleading market quotations of the prices of necessaries, are hereby prohibited, and whenever the President finds it essential in order to prevent undue enhancement, depression, or fluctuation of prices of, or in order to prevent injurious speculation in, or in order to prevent unjust market manipulation or unfair and misleading market quotations of the prices of necessaries, hereafter in this section called evil practices, he is authorized to prescribe such regulations governing, or may either wholly or partly prohibit, operations, practices, and transactions at, on, in or under the rules of any exchange, board of trade, or similar institutions or places of business as he may find essential in order to prevent, correct, or remove such evil practices.

By other sections of the bill the manufacture of distilled spirits and malt liquors is prohibited, but Senators representing wine-producing States were able to secure an exemption for the product of their constituents. This feature of the bill has come in for very general denunciation and will unquestionably prolong its discussion in the Senate and in conference.

Shackling Industry Not the Way

The shackling of industry as proposed by the bill has evoked strenuous protests from some of the most experienced legislators in Congress. Senator Lodge of Massachusetts, whose length of service in Congress is exceeded by but a single Senator, has denounced in the strongest terms many of the provisions of the pending bill, emphasizing the folly of a policy that would load down our leading industries with drastic restrictions while at the same time looking to them for the revenue with which to carry on the war. In an impressive speech on this measure delivered on Thursday, Senator Lodge said, in part:

The first thing that is important is that our industries should be kept at the highest point of productivity. If nobody is making any money, you will not have any excess profits. If nobody is making any money, your income tax will dwindle away, and those are the two great sources of taxation. They will supply at least two-thirds of what we raise. But in order to get the excess profits the profits must be made; in order to get the incomes the incomes must be earned or received, and out of the surplus on incomes and out of that on excess profits you have not only to pay the taxes, but you have to fill your loans. There is where you must get your money. If you paralyze business, if you frighten it, if you repress the productive energies of the country you are drying up the sources of taxation absolutely.

I see no evidence on the part of wealth or business to resist in any way full payment and doing the utmost to supply the money the Government needs. But they can not supply it unless they have it. Confiscating all great estates in the country would not last a year. You must have business going on; you must have it producing from year to year; you must have it make the profits. Take what you want of the profits, take what you want of the incomes, leave enough to supply the loans, leave enough to carry on the business and extend it, but do not kill them at their sources. Do not create a condition in which business will not go on.

It seems to me that the section relating to licenses confers great power upon the President—and when we say the President we mean the agents whom he appoints to carry out the law, for he cannot carry it out. He has more things to do than any human being can do now. He cannot possible do all these things himself. He has to have agents. We are conferring on these

agents, as I apprehend this section, the power to put out of business, absolutely to stop the business, of a corporation, partnership or individual in this country. If somebody in power dislikes or is dissatisfied with some business corporation or partnership there is ample power in the bill to put it out of existence. That may be necessary, but let us consider it pretty carefully before we grant it. It seems to me possible to get all powers that are necessary for the winning of the war without absolutely putting it in the hands of a group of men to ruin any business which they can in some remote way connect with the war, any business engaged in interstate or foreign commerce as we have modified it. Under that section it seems to me that we give the power to fix prices, the maximum. The minimum is given elsewhere. The President's representatives can certainly fix the price of the products of corporations or business houses or business men coming within the description of the section.

It seems to me we can achieve the end which we all seek without these immense extensions. The fact is that in this section you are holding over the heads of the business of the country—not the food crops alone, but all the business of the country—a threat and uncertainty. There is nothing so deadly to business as uncertainty and a threat. You hold that over their heads and then you expect them to be in the highest state of productivity so that you can take millions of dollars from them in excess-profit taxes. They will not have the profits to take from if you frighten business to that extent. Do not lose sight of the fact that the whole key of our situation lies in having the greatest amount of annual earnings that we can properly get in order to supply our taxes and our loans. If you frighten business enough you will not have any excess profits or any incomes to draw on. You will not have any surplus to buy your loans.

The action of the Senate on the control bill cannot be foreshadowed, chiefly for the reason that it is impossible to measure the influence that will be exerted by the prohibition lobby, the numerous associations of farmers and the labor leaders, who are at all times in close touch with Congress. In addition, there is a large element in the Senate composed of men who lose no opportunity to assail the industries of the country and especially those in which there are large combinations of capital. The steel producers are at all times targets for attack. Nothing but the radical amendment of the pending measure will permit its passage without great delay. It is probable, in view of the influences at work in the Senate, that the bill as passed by that body will be in tentative form only and that it will receive its final shape in conference committee. W. L. C.

To Develop a Standard Airplane Engine

WASHINGTON, July 3.—The National Advisory Committee for Aeronautics makes the following announcement concerning the movement recently set on foot to develop a design for a standard engine for airplanes:

"The Aircraft Production Board, realizing the need for the development of a standard engine in various sizes, has succeeded in obtaining the co-operation of two of the foremost engine designers in the country, Messrs. Vincent and Hall. The fundamental idea of the engine is a unit cylinder by means of combinations of which any desired power may be obtained. It is proposed at first to build engines in four sizes of 4, 6, 8 and 12 cylinders, the corresponding horsepowers being approximately 100, 200, 300 and 400."

Chicago Machinery Firm Moves

Hill, Clarke & Co., Chicago, have purchased Nos. 647 and 649 West Washington Boulevard, Chicago, and at a later date will erect a model machinery show room and office building. Pending the construction of the new building, the company will occupy quarters at 625 West Washington Boulevard, having removed from 125 North Canal Street, where it has been located for years. West Washington Boulevard is rapidly becoming the machinery center of Chicago, Canal Street having formerly had that distinction.

Elected to Waiting List

The following have been elected to the waiting list of the American Iron and Steel Institute:

Leonard Colton Hanna, Jr., M. A. Hanna & Co., Cleveland.
James M. Milliken, auditor Midvale Steel Co., Philadelphia.
William P. Marseilles, engineer Latrobe Steel Co., Illinois Steel Co. and Paul Herault, New York.
Frederick C. Yeates, purchasing agent Midvale Steel Co., Philadelphia.
Turner D. Moorhead, vice-president and treasurer Moorhead Brothers & Co., Inc., Sharpsburg, Pa.
Arnold A. Schneider, raw material department, Midvale Steel & Ordnance Co., Pittsburgh.
Samuel Sigourney Wales, electrical engineer Carnegie Steel Co., Pittsburgh.
Charles R. Holzworth, general superintendent Ella Furnace Co. and Claire Furnace Co., West Middlesex, Pa.
A. T. Enlow, president Dominion Sheet Metal Co., Ltd., Hamilton, Ont.
Arch Quarrier Moffat, manager of sales Whitaker-Glessner Co., Wheeling, W. Va.
Lloyd Booth, treasurer Trumbull Steel Co., Warren, Ohio.
Arthur Austin Clement, president American Wire Fence Co., Chicago.
Everett D. Graff, assistant to vice-president Joseph T. Ryerson & Son, Chicago.
F. A. Assmann, chairman executive committee, Standard Tin Plate Co., New York.
Benjamin Wolhaupter, vice-president Rail Joint Co., New York.
Edwin Chapin Witherby, vice-president Semet-Solvay Co., Syracuse, N. Y.
Mark Workman, president Dominion Iron & Steel Co., Montreal, Can.
Richard D. Chapman, general sales manager Taylor Wharton Iron & Steel Co., High Bridge, N. J.
Harry Eugene Brubaker, assistant general manager and general superintendent Ohio Seamless Tube Co., Shelby, Ohio.
F. E. Dussel, secretary and treasurer Transue & Williams Steel Forging Corporation, Alliance, Ohio.
O. F. Transue, president Transue & Williams Forging Corporation, Alliance, Ohio.
J. E. N. Hume, commercial engineer General Electric Co., Schenectady, N. Y.
Samuel Northrup Castle, sales department General Electric Co.; expert electric steel furnace, New York.
Edgar D. Baker, purchasing agent American Steel Export Co., New York.
Robert M. Bird, superintendent rolling mills Lehigh plant, Bethlehem Steel Co., South Bethlehem, Pa.
W. Robert Shimer, metallurgist Bethlehem Steel Co., South Bethlehem, Pa.
Charles S. Vought, assistant general manager sales American Steel Export Co., New York.
A. W. Alexander, Standard Steel Works Co., Philadelphia.
Joseph W. Donner, Donner Steel Co., Inc., Buffalo.

Electric Melting of Brass

The electric melting of brass has been under investigation for several years at Cornell University through a co-operative arrangement between the university and the Bureau of Mines. The work has been done at Morse Hall, where the electric furnace equipment of the chemistry department has been utilized. Long series of experiments have indicated that the use of a suitable electric furnace might materially reduce the metal losses and avoid the use of crucibles. The Bureau of Mines is now testing an electric furnace built on the design worked out in the laboratory tests. It is of commercial size, installed in a brass foundry and is being tested with special attention to its suitability for such brasses as are used for cartridges and shrapnel cases.

Indian and Russian Manganese Ore Exports

Manganese ore exports from India for the nine months ended Dec. 31, 1916, were 466,101 gross tons. This compares with 358,336 tons for the same period in 1915. Of the total last year, 348,192 tons went to Great Britain, as against 295,640 tons of the 1915 total.

Manganese ore exports from Russia in 1916 were only 1440 tons, as compared with none in 1915 and 734,032 tons in 1914.

ESTABLISHED 1855

THE IRON AGE

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Plates Must Win the War

The final test of every policy in this time of revolutionary economic decisions at Washington is the question, Will it help to win the war in the shortest possible time?

The Allies of the United States have said over and over that their supreme immediate need is not men to go into the trenches, great as that need is; but ships, then more ships and still more ships. The case has even been put so strongly as this: that unless there can be a much faster replacement of the tonnage sunk by submarines than has been possible thus far, England will be brought to face a disastrous shortage of food, which may even be decisive of the war.

Too much is at stake to spend time either debating the relative values of steel vessels and wooden vessels, for both should be and are being built, or quibbling over the price to be paid for the plates to build the steel ships. Those representatives of the Government or of war boards who have said that 4.25 cents is too much to pay for ship plates or that 2.50 cents ($56 per gross ton) is all they would allow on Government plate contracts, have said at the same time that they wanted the manufacturers to make a "reasonable profit." The manufacturers on their part have contended that 4.25 cents is not an exorbitant price for plates, when in a competitive market they are offered 5 to 6 cents per pound higher for all the plates they can deliver.

The shortage of steel plates is a world shortage. The memory of man runs to no time of like scarcity in this or any other product of the rolling mill. It rests with those who buy plates for the United States to make a price that will bring out the last ton of plate output for this crucial final stage of the war.

Thus far nearly 80 per cent of the ship plates bought for Government account have come from the mills of the Steel Corporation, whose capacity in plates is less than half the total for the country. The smaller mills, buying their pig iron, would be unjustly penalized in rolling plates for the Government at 2.90 cents, or less than one-third the price of the open market.

The war is costing the Entente Allies $50,000,000 a day. Thus, in the mere money reckoning, the controversy over a matter of a cent a pound more or less for American ship plates may cost hundreds of millions, by its repression of plate mill development. For the Government is doing nothing to create new plate capacity, and if it started work to-day might be eighteen months in getting a producing mill. The more favored mills, owning all raw materials, naturally will make larger profits than the smaller ones that must buy in to-day's inflated market. But here the Government has the equalizer in its own hands, through a heavy impost of war taxes on large earnings.

It has been urged repeatedly, since the question of war taxation came up, that there must be liberal war profits if the Government is to make large war levies without crippling industry. In respect to steel plates, the argument can be made even more definite. Fair plate prices mean more plates. More plates mean more ships. And more ships mean the speedier winning of the war.

Future Steel Exports

At the beginning of the war predictions were made in some quarters that the steel exports of the United States would be greatly increased because supplies from the belligerents would be cut off. Such predictions proved erroneous because the neutral countries did not have the wherewithal to pay. Later their buying power increased, but so did steel prices and ocean freights, and at no time have they taken much steel from either England or the United States. The British exports, while maintained at quite a fair rate, have been chiefly to the colonies and to France. The American exports have been chiefly to the belligerents.

It is an attractive idea that demand for steel banks up during periods of light buying, but such a contention is hardly tenable. It is certainly out of the question to make any such assumption on the part of the neutral countries, for their requirements were increasing at such a rapid rate before the war that by now, if it is merely a question of the lapse of time, they would be inconceivably great. The rapidity of the rate of increase before the war is not generally realized. The total iron and steel exports of the three great exporting countries in 1913 amounted to more than 14,000,000 tons, against 6,000,000 tons ten years earlier. Of course, in each case there were some other exporting coun-

tries, while on the other hand there was tonnage included in the total that went from one producing country to another; but it is safe to assert that the buying by neutral countries more than doubled in the decade. At least an additional five years' record will have been made before the war is over.

As one cannot take the figures above cited as indicative of what is to occur, they can be taken only as a suggestion that if favorable conditions obtain the neutral countries can find good use for a great deal of steel after the war. It is a question of ability to finance. Now the alternations of heavy and light steel demand in the United States are due chiefly to our expanding too much at one time and by our setting our houses in order in the other time, so that we can make a fresh start. A period of economy precedes a period of activity. The neutrals are forced to pass through this period of economy now and should be in position to take hold when the war ends.

The limitation will undoubtedly be found in shipping before it is found in credit. While the British insist that the submarine cannot win the war for Germany, it must be remembered that the last resort would be the use of all the world's merchant shipping to work for the war, leaving no vessels in neutral trade, and at best the world's merchant shipping at the close of the war will be altogether inadequate for the world's normal trade. A great deal of vessel capacity will be required when peace is declared, to take the soldiers and the implements of war back home, and a long time will be required for this tremendous task. There will be no opportunity for the neutrals suddenly to make up for lost time. Rather the trade will gradually increase over a period of years. The United States will have to consume its steel itself very largely immediately after the war, the export business increasing from year to year.

Regulation of Steel Deliveries

Last week's agreement by which it was proposed to reduce bituminous coal prices more than one-third has given impetus to the thought that there will be Government regulation of prices in the iron and steel industry, a subject that was discussed in these columns last week. It is important to note, however, the wide divergence between conditions in the coal industry and those in the iron and steel industry. In the coal industry price regulation may perhaps be all that is necessary to establish satisfactory conditions, while in the iron and steel industry regulation of prices not accompanied by regulation of distribution might merely aggravate an already distressing situation.

The great difference between the two industries is that in coal order books have been relatively clear, while the order books in iron and steel are congested. As the coal operators approached the time when in the ordinary course of events contracts would be made for the twelvemonth beginning April 1 they formulated some contract prices, such as $2.75 or $3 per net ton in the case of Pittsburgh coal; but instead of there being free contracting both buyers and sellers evinced disposition to hold off and the result was that only a small proportion of the output was placed under contract. The remaining coal was not all bought and sold in the spot market, technically, because in many cases an understanding was reached whereby regular shipments were to be made and billed at prices adjusted from week to week in accordance with the spot market ruling. Thus no complications arise when a fixed price is determined upon as a basis for additional sales. The sellers cannot avoid selling and the buyers cannot avoid buying.

In the iron and steel industry conditions are totally different. The mills and furnaces are booked for various distances ahead. The blast furnaces probably have on their books a tonnage equal to the production for more than six months. The Steel Corporation's unfilled obligations are equal to its full output for more than nine months. Nearly all the large independents are booked almost as far ahead, while the smaller mills as a rule are booked for from three to six months.

In the case of coal the operators merely make a fresh start at the new prices. In the case of iron and steel there would be no start at all. Business, now on a very restricted scale, would be stopped entirely for a time, unless buyers were permitted to gamble as to their prospective requirements, in which case a limit would certainly have to be set on the distance ahead to which commitments would be permitted. If, at the outset there were no disposition to buy ahead, then there would have to be a wait of many months before the order books of producers were reduced to the condition that existed in the case of the coal industry when last week's conference was held was effected.

Meanwhile, whether or not there were forward buying at the outset, deliveries would be made to buyers in order of priority. Many of the existing contracts were made before the country entered the war. It is not to be supposed that the manufacturing consumers who are best represented on the order books of the steel mills are those whose products are the most essential for our throwing of the entire resources of the country to the one object of prosecuting the war as vigorously as possible. If so, the distribution of the steel by following the ordinary course in executing contracts, will not be to the best advantage of the country. In addition to this undesirable condition, the new purchases that might be made at prices limited by the authorities would have no rein and in many cases would be of material not needed as an aid in the prosecution of the war.

There are only two reasons, each being of the utmost importance however, why prices should, if possible, be regulated. The first is that while satisfactory prices for Government material can readily be arranged, it is impossible for us to prosecute the war with all our resources and yet draw the line, in the matter of steel products, at the steel which will eventually become the property of the Government, as in a shell, a camp stove or a ship. There must be no avoidable scarcity of cars, of locomotives, of milk cans, of agricultural implements, of a host of things which even the expert inteiligence marshaled in aid of the Government cannot now inventory. The second reason is that for the best prosecution of the war all business not inimical to that end should be prosecuted as usual. The consumers of steel must be allowed to stay in business if no harm results, and their profits must not be taken away if the opera-

tion represents merely an addition to the profits of the producer.

From this viewpoint the matter of the distribution of the steel as made is at least as important as its price. Fortunately the problem of distribution, once the question of prices were settled, would be a relatively simple one. The fixing of prices is extremely difficult, on account of the multifarious forms, sizes and qualities in which finished steel is furnished to consumers. Reasonable price fixing by the manufacturers themselves would be very difficult, and by outsiders impossible, yet the authorities might not be content to leave the operation to the producers.

The case of distribution is altogether different. The steel manufacturers are entirely familiar with the uses to which customers put their products. This familiarity has greatly increased in the past few years when by constant contact beween buyer and seller the steel produced has been adapted to the particular requirements involved. A few general rules which could be formulated readily by the Advisory Commission, would give the steel manufacturers a start, sufficient to dispose of many of the questions that would arise. As others were developed, they could be referred to a central body, which would issue instructions not only to the parties involved in the individual controversy, but to all others, so that practice should be uniform throughout the industry. The mills would have no incentive but to proceed along lines best calculated to help win the war, and with their thorough knowledge of detail and such relatively simple aid as would be required from the central body they could be depended upon to distribute the steel in such manner as to throw all our material resources of this description into the contest with the Imperial German Government.

In the President's proclamation of April 15 the assistance of the Government is pledged to the farmers in, among other things, the "means of expediting shipments of fertilizers and farm machinery"; but now among many other matters lying outside the category of "Government purchases" lies not the shipment of farm machinery but its manufacture whereby the fullest possible crops in 1918 may be assured, and that is only one of many items, some less and some more pressing, but all hinging to an extent upon the proper distribution of the steel that is produced.

Another advocate of one general American engineering society has been discovered in the person of A. A. Stevenson, who in his address as president of the American Society for Testing Materials said he looked forward to the day when there shall be such an institution, "made up of the various societies as members, their individuality maintained, but the work so correlated as to give greater efficiency and better results." As men in prominent places reiterate the idea and the arguments in favor are accepted as fully overbalancing those against, a general demand will develop which must be heeded. Each society has a coterie of supporters who are jealous of the ideals for which it has stood, at least in the eyes of the nucleus about which it has grown; but combination should not be impossible, if due effort is made, particularly in view of the present woeful duplication of effort.

Orders Placed for Machine Guns

WASHINGTON, July 2.—Orders aggregating 4000 Lewis machine guns have been awarded the Savage Arms Company by the War Department. These guns will be chambered for United States ammunition, but an additional order for several hundred guns chambered for British ammunition is also about to be placed with the Savage Arms Company, licensee under the Lewis patent, for use on aircraft at aviation training schools. The American cartridge used by the Lewis gun has a muzzle velocity of 2700 ft. per second, but while the muzzle velocity of the British cartridge is only 2300 ft. it is deemed wise to chamber the aircraft guns for British ammunition in view of the probability that there will be more or less coordination between the aviation corps of the American and British armies.

It is expected that further large orders for the Lewis gun for the American troops to be sent to France will soon be placed with the Savage Arms Company, which is now fitted up to deliver a maximum of 1600 of these weapons per month and which will have an output of at least 2000 per month by September. The purchase of these guns has been decided upon as the result of the findings of the board of army officers headed by Brig.-Gen. F. H. French, which recently conducted a series of competitive tests on machine guns.

In accordance with the recommendations of Gen. Leonard Wood and other army officers, the allotment of machine guns in the new National Army will be several times as many per regiment as heretofore and will approximate 12 per thousand men or about 20,000 guns for the estimated infantry force.

To Withhold Information on Shipbuilding Plans

WASHINGTON, July 2.—The United States Shipping Board to-day published the following bulletin:

TO WHOM IT MAY CONCERN:—As a war measure, the Government has found it necessary to adopt the policy of discouraging, in every reasonable way, the publication and dissemination of information in regard to merchant marine ship construction, that might aid or influence the military plans of the enemy, in the present emergency.

To conform to this policy, the United States Shipping Board Emergency Fleet Corporation, hereafter, will not be able to give out for publication, or other use, any information relating to the number, size and character of vessels under contract, the place where they are being built, and by whom, the percentage of completion, date of final completion, etc.

In explantion of the new policy of secrecy, it was stated to-day that complaints have reached the board from new concerns attempting the equipment of yards for the construction of cargo ships for the emergency fleet that their efforts encountered obstacles placed in their way by pro-German influences. It is also stated that Secretary of Commerce Redfield advised the board to suspend the publication of bulletins regarding contracts for construction. The Bureau of Navigation, which is in Secretary Redfield's jurisdiction, discontinued several months ago the publication of periodical bulletins on merchant construction in American yards.

Pig-Iron Manufacturers Plan to Work with the Government

A number of pig-iron manufacturers from different sections met on Friday, June 29, in New York, to discuss ways and means of serving the Government to the limit of their ability, wherever pig iron might be required for use in any of its departments. There was a general discussion of methods that might be followed to the best advantage, and while no definite plan was developed, a committee consisting of representative pig-iron manufacturers in different districts was appointed, with C. D. Dyer, Shenango Furnace Co., Pittsburgh, as chairman. This committee will give the matter further consideration in the near future after having conferred with Government officials at Washington.

Controversy Over Coal Prices

WASHINGTON, July 2.—Another controversy in high official circles that involves the Cabinet, the Federal Trade Commission, and the Council of National Defense, threatening changes in the personnel of all these important bodies, has been precipitated by an attempt by Secretary of the Interior Lane, Trade Commissioner Fort, and Chairman Peabody of the committee on coal production of the Council of National Defense, to bring about an agreement among the bituminous coal producers of the country to reduce prices and increase output. At the suggestion of these officials, the coal operators, some 400 in number, undertook to forestall both the Senate and the Federal Trade Commission by announcing their willingness to make substantial cuts in their prices, both to the Government and to private consumers, the new schedule to be effective July 1, but after the producers' agreement had been promulgated, and Secretary Lane had caused to be made public a transcript of a speech delivered by him to the coal men, praising their "patriotic course," Secretary of War Baker and Secretary of the Navy Daniels denounced the entire transaction, Secretary Baker delivering a sharp lecture to his Cabinet colleague upon the usurpation of authority by the Council of National Defense, and describing the coal prices agreed upon as "exorbitant, unjust and oppressive."

Three dollars for bituminous coal, f.o.b. the mine, $3.50 for lump sizes, and a reduction of 50 cents on every ton for the Government, were the prices agreed upon at a meeting of the coal operators held here. Prices heretofore ruling ranged as high as $5.50. Secretary Daniels declared that the Navy would continue to buy from the mines as heretofore at the tentative price of $2.33 a ton, leaving the final price to be determined after the Federal Trade Commission has ascertained production costs. Secretary Baker, as president of the Council of National Defense, declared in a letter addressed to Director Gifford of the Council, that "the Council has no legal power and claims no legal power either to fix the price of coal or to fix a maximum price for coal or any other product. The coal production committee is a subordinate committee purely advisory in its character." Secretary Baker added that his letter was written "for the information of the coal production committee, and for the guidance of all other sub-committees of the council."

Progress in Priority Shipment Legislation

WASHINGTON, July 2.—The priority of shipment bill recently adopted by the Senate was passed by the House on June 29 and will probably be agreed to in conference before the end of the present week. The measure authorizes the President to require interstate common carriers to give preference in shipment to certain commodities, the transportation of which is important from a military standpoint. The House amended the bill, however, to provide that the prohibitions against interference with the operations of the railroads contained in the bill should not be construed as interfering in any way with strikes of railroad employees.

The amendment provides specifically that nothing in the proposed law shall be construed to repeal, modify, or affect either section 6 or section 20 of the Clayton act amending the Sherman Antitrust law. These provisions exempt labor organizations from prosecution as "illegal combinations or conspiracies in restraint of trade" and forbid the issuance of restraining orders or injunctions in labor disputes except under certain circumstances. The House adopted the Senate amendment limiting the operation of the measure to time of war and to commodities having military importance.

The La Salle Machine & Tool Co., La Salle, Ill., has covered all of its employees with "group insurance." The life of every employee on the payroll is so insured that if he dies from any cause his designated beneficiary will receive an amount equal to one year's wages, not to exceed $2000 nor less than $300. No employee can share in this benefit until he has been with the company for six months.

CONTENTS

LESS PIG IRON IN JUNE

Decline of 1200 Tons a Day from the Rate in May

A Gain of Nine in Active Furnaces, but Coke Troubles Continue

Pig-iron production fell off in June by more than 1200 tons a day from the rate in May. The total as compiled from figures reported to THE IRON AGE in unusually short time after the close of the month was 3,270,055 tons, or 109,002 tons a day, against 3,417,340 tons in May, or 110,238 tons a day. Coke shortage has been a continuing factor. More furnaces are blowing in with each month though many of them are small and on July 1, 349 furnaces were in blast, representing a net gain of 9 in June. Our estimate of the capacity of the furnaces active July 1, modified by the poor performance in June and the probability that coke shortages will continue to be a factor in July, is 112,155 tons a day as compared with 111,704 tons a day on June 1.

Owing to the short time for compilation, the steel works and merchant furnace outputs are not separated in the figures below.

The production of ferromanganese and spiegeleisen in June was 30,262 tons as compared with 37,701 tons in May.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in June and the three months preceding:

Monthly Pig-Iron Production—Gross Tons

	Mar. (31 days)	Apr. (30 days)	May (31 days)	June (30 days)
New York	176,550	188,547	198,111	193,198
New Jersey	6,271	6,863	9,485	14,340
Lehigh Valley	127,118	119,962	117,584	114,465
Schuylkill Valley	84,758	86,416	100,531	94,097
Lower Susquehanna and Lebanon Valley	69,152	80,673	83,985	79,989
Pittsburgh district	697,487	705,992	690,919	651,768
Shenango Valley	171,534	183,288	176,200	171,074
Western Pennsylvania	198,734	202,733	211,621	202,145
Maryland, Virginia and Kentucky	87,991	94,754	106,768	99,238
Wheeling district	125,021	129,569	129,169	125,403
Mahoning Valley	324,862	323,683	335,797	307,829
Central and Northern Ohio	279,124	283,067	276,712	278,396
Hock. Val., Hang. Rk. & S. W. Ohio	49,517	56,556	55,544	60,866
Chicago district	438,975	470,338	506,297	489,780
Mich., Minn., Mo., Wis. and Col.	120,804	124,088	122,312	118,109
Alabama	258,695	246,164	260,969	234,259
Tennessee and Ga.	34,759	32,267	35,336	35,099
Total	3,251,352	3,334,960	3,417,340	3,270,055

Diagram of Pig-Iron Production and Prices

The fluctuations in pig-iron production from January, 1909, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The two other curves on

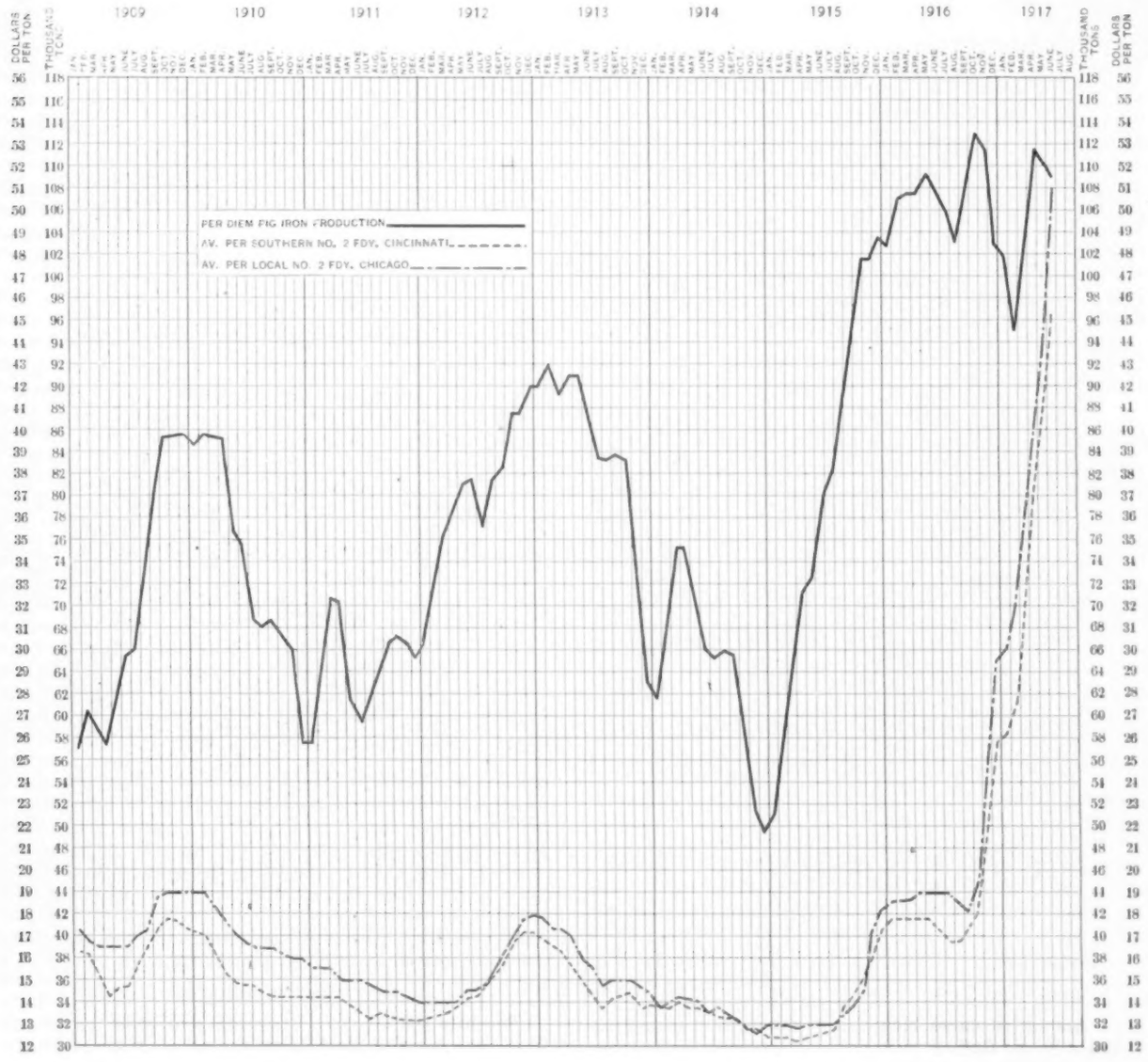

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from Jan. 1, 1908, to July 1, 1917; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from June, 1916, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
June, 1916	76,526	30,527	107,053
July	74,397	29,620	104,017
August	74,617	28,729	103,346
September	76,990	29,755	106,745
October	81,639	31,550	113,189
November	80,141	30,253	110,394
December	74,264	28,273	102,537
January, 1917	72,394	29,249	101,643
February	65,280	29,193	94,473
March	73,731	31,132	104,863
April	79,031	32,134	111,165
May	77,722	32,516	110,238
June	....	....	109,002

The figures for daily average production, beginning January, 1910, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1910
Gross Tons

	1910	1911	1912	1913	1914	1915	1916	1917
Jan.	84,148	56,752	66,384	90,172	60,808	51,659	102,746	101,643
Feb.	85,616	64,090	72,442	92,369	67,453	59,813	106,456	94,473
Mar.	84,459	70,036	77,591	89,147	75,738	66,575	107,667	104,882
Apr.	82,792	68,836	79,181	91,759	75,665	70,550	107,592	111,165
May	77,102	61,079	81,051	91,039	67,506	73,015	108,422	110,238
June	75,516	59,585	81,358	87,619	63,916	79,361	107,053	109,002
July	69,305	57,841	77,738	82,601	63,150	82,691	104,017	.....
Aug.	67,963	62,150	81,046	82,057	64,363	89,666	103,346	.....
Sept.	68,476	65,903	82,128	83,531	62,753	95,085	106,745	.....
Oct.	67,520	67,811	86,722	82,133	57,361	100,822	113,189	.....
Nov.	63,659	66,648	87,697	74,453	50,611	101,244	110,394	.....
Dec.	57,349	65,912	89,766	63,987	48,896	103,333	102,537	.....

Capacity in Blast July 1 and June 1

The following table shows the daily capacity in gross tons of furnaces in blast July 1 and June 1 by districts:

Coke and Anthracite Furnaces in Blast

Location of furnaces	Total number of stacks	July 1 Number in blast	July 1 Capacity per day	June 1 Number in blast	June 1 Capacity per day
New York:					
Buffalo	18	18	5,985	18	5,965
Ferro	1	1	60	0	0
Other New York	5	2	475	3	650
New Jersey	4	3	640	3	655
Ferro	1	1	50	0	0
Pennsylvania:					
Lehigh Valley	21	14	3,695	14	3,705
Spiegel	2	2	220	2	215
Schuylkill Val.	13	11	3,175	11	3,243
Lower Susquehanna	7	6	1,610	6	1,584
Lebanon Valley	7	8	1,060	6	985
Ferro and Spiegel	3	1	45	3	165
Pittsburgh Dist.	53	47	22,150	46	22,536
Ferro and Spiegel	4	4	450	4	545
Shenango Val.	19	19	6,105	18	5,929
Western Pennsylvania	25	22	6,954	18	6,240
Ferro and Spiegel	3	2	210	3	350
Maryland	3	3	1,355	4	1,444
Ferro	1	1	100	0	0
Wheeling District	14	12	4,147	12	4,167
Ohio:					
Mahoning Val.	25	25	10,450	25	10,832
Central and Northern	26	25	9,355	23	8,686
Hocking Val., & Hang. R'k.	15	13	2,042	13	1,866
Illinois and Ind.	37	33	16,304	33	16,064
Ferro	2	1	72	1	77
Michigan, Wis. & Minn.	12	11	2,748	11	2,689
Colorado & Missouri	5	4	1,110	4	1,122
Ferro	2	1	50	1	121
The South:					
Virginia	18	12	1,515	12	1,561
Kentucky	5	4	610	4	620
Alabama	37	30	8,048	30	8,404
Ferro	1	1	75	1	80
Tennessee	15	11	1,190	11	1,204
Georgia	1	1	100	0	0
Total	405	349	112,155	340	111,704

Among furnaces blown in last month were one Niagara in the Buffalo district, Musconetcong in New Jersey, Sheridan in Lebanon Valley, one Eliza (new) in the Pittsburgh district, one Farrell in the Shenango Valley, one Earlston, Colonial and Adrian in western Pennsylvania, West End in Virginia, one Lorain in northern Ohio, Globe and Jisco in the Hanging Rock region, No. 2 Clifton in Alabama and Silver Run in Georgia. Furnaces blown out included Northern in New York, Dora in Virginia, Star in the Hanging Rock region and one Vanderbilt in Alabama.

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1913—Gross Tons

	1913	1914	1915	1916	1917
Jan.	2,795,331	1,885,054	1,601,421	3,185,121	3,150,938
Feb.	2,586,337	1,888,670	1,674,771	3,087,212	2,645,247
Mar.	2,763,563	2,347,867	2,063,834	3,337,691	3,251,352
Apr.	2,752,761	2,269,655	2,116,494	3,227,768	3,334,960
May	2,822,217	2,092,686	2,263,470	3,361,073	3,417,340
June	2,628,565	1,917,783	2,380,827	3,211,588	3,270,055
6 mo.	16,348,774	12,401,715	12,100,817	19,410,453	19,069,892
July	2,560,646	1,957,645	2,563,420	3,224,513	.....
Aug.	2,545,763	1,995,261	2,779,647	3,203,713	.....
Sept.	2,505,927	1,882,577	2,852,561	3,202,366	.....
Oct.	2,546,261	1,778,186	3,125,491	3,508,849	.....
Nov.	2,233,123	1,518,316	3,037,308	3,311,811	.....
Dec.	1,983,607	1,515,752	3,203,322	3,178,651	.....
Total, yr.	30,724,101	23,049,752	29,662,566	39,039,356	.....

Blast Furnace Notes

Earlston furnace at Earlston, Pa., owned by Joseph E. Thropp, was blown out May 16 and blown in June 27. The entire furnace was relined in 12 days. Repairs on the stoves and blowing engines delayed the starting several days.

Palmerton furnace No. 2 of the New Jersey Zinc Co. was blown out June 20 and blown in on June 27, having been relined in the interval.

Lebanon Valley furnace of E. J. Lavino & Co., Lebanon, Pa., was blown in July 2 after having been out for repairs.

The furnace of E. J. Lavino & Co. at Sheridan, Pa., was blown in June 10.

The Virginia Iron, Coal & Coke Co. blew out its Dora furnace in Virginia on June 21.

All five furnaces of the National Tube Co. at Lorain, Ohio, are now in blast. No. 5 furnace was banked 16 days in June.

Texas and Oklahoma Rolling Mill Merger

The Texas Rolling Mill Co., Fort Worth, Tex., and the Osage Iron & Steel Co., Sand Springs, Okla., have been merged in a new corporation known as George W. Armstrong & Co., Inc., Fort Worth, Tex. George W. Armstrong had been president of the Texas Rolling Mill Co. and vice-president of the Osage Iron & Steel Co. The product at Fort Worth is merchant and reinforcing bars, bolts, nuts and spikes and the annual capacity is 15,000 tons. The capacity of the Sand Springs mill is 10,000 tons a year of merchant bar iron and reinforcing steel. It is expected that improvements will be made at both plants.

May Imports of Ferromanganese Very Small

Ferromanganese imports in May were only 2187 gross tons, according to data furnished THE IRON AGE. This is the lowest in many months and is nearly a low record for the war, excepting the period soon after the war's inception when imports in the first quarter of 1915 were only 548 tons or 182 tons per month. The May imports compare with an average of 6190 tons per month to May 1, 1917, and bring the average to June 1 down to 5389 tons per month. The May receipts were through the respective ports as follows: 1018 tons at Baltimore, 1001 tons at Philadelphia, 168 tons at New Orleans; none at Norfolk or New York.

Recently the city of Pittsburgh sold about 200 tons of mixed iron and steel scrap for which it secured an average of about $30 per ton. On some of the items, the price paid for the scrap was almost as high as when the equipment was installed by the city.

Iron and Steel Markets

A CHAOTIC CONDITION

Government Policy on Prices Dominates

Further Advances in Pig Iron—Scrap Market Slumps in the Middle West

The uncertainty as to the Government's attitude on prices of the leading materials of war has been only increased by the coal fiasco and other events of the past week. Producers and manufacturing consumers of steel look for the early intervention of a deciding power that will bring an end of the present chaos, but in the interval business apart from Government wants is largely at a standstill. The possibility of Government intervention on a large scale in steel, coal, metals, and other important markets, has a widespread repressing and unsettling influence.

Meantime, new proofs of the larger place Government needs are already taking are the fact that 25 to 30 per cent of sheet mill capacity is thus occupied; that probably two-thirds of the users of cold-rolled strip steel are producing for the Government; that the Carnegie Steel Co. alone is turning out material for the one ultimate buyer at the rate of 60,000 tons of plates and 15,000 tons of steel bars per month.

With all the confusion of wide spreads in prices, and with fewer good-sized transactions to guide, definite advances, some of them very large jumps, are again to be recorded. Pig iron is generally $2 per ton higher; prompt furnace coke has sold at $16, or a rise of $3; leading makers of wrought-iron pipe have raised their prices $10 to $16 per ton; light rails have been advanced by $10 to $15, and railroad spikes and track bolts by $5 to $10, while some makers of rivets and bolts have quoted 10 per cent higher within the week.

The distress caused by delayed deliveries of materials is spreading, and more plants have been forced below a 50 per cent operating schedule. Car builders are getting barely more than one-fourth the plates they need. Complaints of labor shortage are more frequent, and arrangements are being made to admit more women in light manufacturing jobs.

Indicating the lengths it is necessary to go to make sure of material is the effort of a large electrical concern to close for first quarter for 6000 tons of basic iron, to be shipped to a steel mill for conversion into sheet bars and finally into electrical sheets.

A very considerable demand has appeared for electric steel. Three months ago there was a surplus of this product, and it was sold on open-hearth specifications. Government activity in many directions has caused a sudden change, and now makers are four months behind on deliveries.

The structural market is largely a Government affair. For the new projectile plant at Charleston, W. Va., 2300 tons are called for, and the leading fabricator has taken not far from 30,000 tons in various Government contracts. For extending its open-hearth plant at Youngstown, the Republic Iron & Steel Co. has let 2500 tons of structural steel.

The overhanging of Government control has been plainly a factor in the scrap market, which in Western districts has slumped $2 to $5 per ton. There were other influences at work also. The recent excited advance was too rapid to stand all the consequences of short selling and of the necessity some dealers were under of having to buy two tons of material in order to secure the delivery of one.

The 10,000 tons of foundry iron wanted promptly by the Government has not yet been distributed. A distribution is also expected in the case of the 60,000 tons of Bessemer iron for Italy. Only lately, due to impossible ocean freights, pig iron sent to the seaboard for export to Italy had to be resold and shipped back to the Middle West.

Bessemer iron has sold at $56 to $58, with some makers asking $60, and basic sales were made at $52 to $54, with present quotations $55 and higher. Two steel mills want 10,000 tons each of basic for the first half of 1918. In spite of soaring prices and the spectre of Government control there is steady buying of foundry and steel-making irons.

A surprising record in Lake Superior iron-ore shipments was made in June, and some of the loss caused by the late opening of navigation was wiped out. The total for the month was 9,639,991 gross tons, a gain of 132,415 tons over June, 1916. Shipments to July 1 were 16,135,135 tons, a loss of 3,480,432 tons as compared with the same time last year.

Coke troubles again limited pig-iron production in June, the total for the month falling to 3,270,055 tons, or 109,002 tons a day, against 3,417,340 tons in May, or 110,238 tons a day. The output for the first half of 1917, at 19,069,892 tons, shows an unexpected falling off from that of 19,410,453 tons in the first half of 1916. Yet 349 furnaces were active July 1, against 323 one year previous. The capacity active as July came in was 112,155 tons a day, against 111,704 tons a day for 340 furnaces on June 1.

Pittsburgh

PITTSBURGH, July 2. (*By Wire.*)

The supply of semi-finished steel in the form of billets and sheet bars to independent finishing mills is steadily growing smaller, and this is cutting down output of finished material very considerably. Steel mills are drawing the lines closer in regard to new selling, and only a small amount of new business is being put on the books of the mills at this time. The probable Government requirements of steel in various forms are growing steadily larger, and until the mills know more definitely how much of their product must go to the Government, they will not sell very freely to domestic customers. The fact that one local steel interest is now furnishing about 60,000 tons of plates per month and 15,000 tons or more of steel bars, while sheet mills are said to be furnishing 25 to 30 per cent of output to the Government, gives some idea of what the eventual Government demands will be when they are shaped up and

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 3, 1917.	June 27, 1917.	May 29, 1917.	July 5, 1916.
No. 2 X, Philadelphia...	**$52.00**	$50.75	$45.50	$19.75
No. 2, Valley furnace...	**55.00**	53.00	43.00	18.25
No. 2 Southern, Cin'ti...	49.90	47.90	42.90	16.90
No. 2, Birmingham, Ala.	**47.00**	45.00	40.00	14.00
No. 2, furnace, Chicago*	55.00	55.00	46.00	19.00
Basic, del'd, eastern Pa..	50.00	50.00	42.50	19.50
Basic, Valley furnace...	**52.00**	50.00	42.00	18.00
Bessemer, Pittsburgh....	**57.95**	55.95	45.95	21.95
Malleable Bess., Ch'go*.	55.00	55.00	46.00	19.50
Gray forge, Pittsburgh..	47.95	47.95	40.95	18.70
L. S. charcoal, Chicago..	57.00	57.00	50.25	19.75

Rails, Billets, etc., Per Gross Ton				
Bess. rails, heavy, at mill	38.00	38.00	38.00	38.00
O.-h. rails, heavy, at mill	40.00	40.00	40.00	40.00
Bess. billets, Pittsburgh.	100.00	100.00	95.00	42.00
O.-h. billets, Pittsburgh.	100.00	100.00	95.00	42.00
O.-h. sheet bars, P'gh....	105.00	105.00	95.00	42.00
Forging billets, base, P'gh	125.00	125.00	110.00	69.00
O.-h. billets, Phila.....	110.00	110.00	95.00	50.00
Wire rods, Pittsburgh....	95.00	95.00	90.00	50.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia..	4.659	4.659	4.159	2.659
Iron bars, Pittsburgh....	4.75	4.75	4.00	2.50
Iron bars, Chicago.....	**4.50**	4.10	3.50	2.35
Steel bars, Pittsburgh...	4.50	4.50	4.00	2.75
Steel bars, New York....	4.669	4.669	4.169	2.919
Tank plates, Pittsburgh..	9.00	9.00	7.00	3.25
Tank plates, New York..	9.169	9.169	7.169	3.419
Beams, etc., Pittsburgh..	4.50	4.50	4.00	2.50
Beams, etc., New York..	4.669	4.669	4.419	2.669
Skelp, grooved steel, P'gh	4.00	4.00	3.50	2.35
Skelp, sheared steel, P'gh	6.00	6.00	5.50	2.45
Steel hoops, Pittsburgh..	5.25	5.25	4.25	2.75

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 3, 1917. Cents.	June 27, 1917. Cents.	May 29, 1917. Cents.	July 5, 1916. Cents.
Sheets, black, No. 28, P'gh	**8.50**	8.00	7.50	2.90
Sheets, galv., No. 28, P'gh	**10.00**	9.75	9.00	4.50
Wire nails, Pittsburgh...	4.00	4.00	3.50	2.50
Cut nails, Pittsburgh....	4.65	4.65	4.00	2.60
Fence wire, base, P'gh..	3.95	3.95	3.45	2.45
Barb wire, galv., P'gh...	4.85	4.85	4.35	3.35

Old Material, Per Gross Ton:				
Iron rails, Chicago.....	*$37.00*	$49.00	$38.50	$18.00
Iron rails, Philadelphia..	52.00	52.00	35.00	20.00
Carwheels, Chicago	*37.00*	43.00	33.00	12.00
Carwheels, Philadelphia..	**38.00**	35.00	30.00	16.00
Heavy steel scrap, P'gh..	*42.00*	45.00	30.00	16.00
Heavy steel scrap, Phila..	**40.00**	39.00	26.00	14.75
Heavy steel scrap, Ch'go.	*36.00*	39.00	32.00	14.00
No. 1 cast, Pittsburgh...	*35.00*	38.00	26.00	15.75
No. 1 cast, Philadelphia.	39.00	39.00	30.00	16.00
No. 1 cast, Ch'go (net ton)	*30.50*	32.00	26.00	11.50
No. 1 RR. wrot, Phila....	57.00	57.00	42.00	19.50
No. 1 RR. wrot, Ch'go (net)	*40.00*	44.00	36.00	14.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt...	**$15.00**	$13.00	$8.50	$2.75
Furnace coke, future....	9.50	9.50	8.00	2.50
Foundry coke, prompt...	*13.00*	14.00	9.50	3.25
Foundry coke, future....	10.00	10.00	9.00	3.50

Metals, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	*31.75*	32.50	32.50	27.00
Electrolytic copper, N. Y.	*31.75*	32.50	32.50	26.50
Spelter, St. Louis.....	*9.00*	9.12½	9.37½	10.75
Spelter, New York.....	*9.25*	9.37½	9.62½	11.00
Lead, St. Louis.....	*11.25*	11.50	11.22½	6.65
Lead, New York.....	*11.37½*	11.70	11.37½	6.85
Tin, New York.....	62.00	62.00	65.00	38.87½
Antimony (Asiatic), N. Y.	19.00	19.00	24.00	16.00
Tin plate, 100-lb. box, P'gh	$12.00	$12.00	$8.50	$6.00

come to the mills. It is now believed that a statement made some time ago that 40 per cent of the output of the finishing steel mills would be needed for Government purposes was not an over statement of fact. Prices continue to advance, though not in the same ratio as several weeks ago. All grades of pig iron are up about $2 per ton, and light rails from $10 to $15 per ton. Any prices are being paid for plates, also for hoops and bands, while railroad spikes and track bolts are higher by $5 to $10. Two leading makers of iron pipe have put out lower discounts, showing advances of $10 to $16 per ton. There is an abnormal demand for prompt furnace coke, and it has sold up to $16 per net ton at oven, for shipment to Eastern furnaces. The only soft spot in the whole market is scrap, new buying of which has suddenly ceased, the high prices reached having set both dealers and consumers to thinking what may come if the Government takes hold of the scrap situation and regulates prices that shall be charged for it to the steel mills. Dealers are afraid to buy, or to sell, with the result that very little scrap is moving. The shortage in labor is getting more acute and in some light manufacturing plants women are now doing the work that was formerly done by men. The whole steel trade is in a waiting attitude and will continue so until more is known as to how large Government purchases are going to be and what prices will be paid for the different steel products. Consumers are in distress for lack of deliveries of raw materials, and their output is being cut down very much—in some cases more than 50 per cent.

Pig Iron.—W. P. Snyder & Co. report that the average price of Bessemer iron in June was $53.26 on sales of 1000 tons or more and of basic $49.15, both in gross tons at Valley furnace. These prices show an advance in Bessemer in June over May of $7.27 and of basic $7.26, the highest advances in both grades of pig iron ever known in one month in the whole history of the pig iron trade. Actual sales of Bessemer and basic iron in the past week have been light, not because of lack of inquiry, but for the reason that the pig iron cannot be had. No action was taken last week on the inquiry from Italy for 60,000 tons of Bessemer iron, but it is understood our Government will insist that this iron be furnished as promptly as possible and a local committee is now at work trying to figure out where the iron is to be obtained, and how much of the entire order each furnace will supply that is making Bessemer iron. The United States Government is in the market for 10,000 tons of foundry iron for delivery as promptly as the furnaces can turn the iron out, but the order has not yet been distributed. There have been sales in the past week of Bessemer iron at prices ranging from $56 to $58, with some sellers now quoting $60, but no actual sales have been made at that figure. Sales of basic have been made at $52 to $54, and sellers are now quoting $55 and higher at furnace. Prices on No. 2 foundry iron are $55 at Valley furnace, and some furnaces are quoting $60. The Whitaker Glessener Company, Wheeling, W. Va., is in the market for 10,000 tons of basic iron and the Erie Forge Company wants the same amount, both for delivery in first half of next year. The General Electric Company is inquiring for 6000 tons of basic iron for first quarter, and it is believed this iron is intended to be shipped to a steel mill for conversion into open hearth sheet bars, these to be rolled into electrical sheets for the General Electric Company. We note a sale of 5000 tons of basic iron for delivery over last half of this year at $52 and 2000 tons for the same delivery at $53 at Valley furnace. Sales of 500 to 1500 tons of Bessemer have been made at $56 up to $58 at Valley furnace. We note sales of 2500 to 3000 tons of No. 2 foundry iron for delivery this year at $55 Valley furnace, also a sale of 1000 tons of malleable Bessemer iron for last half delivery at $55, Valley furnace. We now quote Bessemer iron at $57 to $58; basic, $52 to $54; malleable Bessemer, $53 to $55; No. 2 foundry, $55 to $58, and gray forge, $47 to $48, all at Valley furnace

for delivery this year. The freight rate from Valley furnace on pig iron to the Cleveland-Pittsburgh districts is 95c. per ton.

Billets and Sheet Bars.—Very little is being done in billets and sheet bars, as the steel simply cannot be had. Mills that roll billets and sheet bars are refusing to sell and are cutting down deliveries of steel to regular customers. There is a great deal of activity in forging billets, which bring anywhere from $125 to $135 for ordinary carbons. Nothing has been done on the inquiry for 10,000 tons of forging billets noted in this report last week, and it is very doubtful whether they can be had.

We now quote soft Bessemer and open-hearth billets at $95 to $100 and soft Bessemer and open-hearth sheet bars at $105 to $110, maker's mill, Pittsburgh or Youngstown. We quote forging billets at $125 to $135 per ton for ordinary sizes and carbons, f.o.b. maker's mill.

Ferromanganese.—As noted in this report last week, the new inquiry for 80 per cent domestic ferromanganese for delivery over last half of this year and also in the first half of next year is active. For delivery over last half of this year, we quote 80 per cent domestic ferromanganese at $425 and for first half of next year $400 per gross ton at maker's furnaces. Small lots of 50 per cent ferrosilicon for spot shipment are still bringing $200 up to $250 per gross ton at furnace. We quote 18 to 22 per cent spiegeleisen at $80 to $85 per gross ton at maker's furnace. The new demand for Bessemer for silvery iron is only fairly active, most consumers being covered over the remainder of this year and furnaces are sold up for the same period. One sale of 100 tons of 9 per cent Bessemer ferrosilicon has been made at $95 at furnace for fairly prompt delivery, which is $6 per ton higher than what are regarded as regular prices.

We quote 9 per cent Bessemer ferrosilicon at $89, 10 per cent $90, 11 per cent $95, 12 per cent $100, 13 per cent $105, 14 per cent $115, 15 per cent $125, and 16 per cent $135. We now quote 7 per cent silvery iron at $51 to $52, 8 per cent $52 to $53, 9 per cent, $54 to $55, 10 per cent, $55 to $56, 11 and 12 per cent $57 to $58. All f.o.b. makers' furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., these furnaces having a uniform freight rate of $2 per gross ton for delivery in the Pittsburgh district.

Steel Rails.—Nothing is being done in new orders for standard sections, but the new demand for light rails is very active, and prices are from $10 to $15 per ton higher and very great trouble is experienced in finding any new light rails for fairly prompt shipment. The Cambria and Carnegie Steel companies are reported sold up for a year or more on light rails, with the result that rerolling rail mills are now getting as much for their rerolled light rails as is being charged for new light rails. One sale of about 75 tons of 25 to 45 lb. rerolling rails is reported at $84, maker's mill. Prices on new light rails and on standard sections are given on page 48.

Structural Material.—Very little new business is being placed and most of it is coming from the Government. The McClintic-Marshall Co. has taken about 2500 tons for extensions to the open hearth building of the Republic Iron & Steel Co. at Youngstown, Ohio. Mill prices on beams and channels up to 15 in. range from 4.50c. to 4.75c. at mill for delivery late this year. Small lots from warehouse range from 5.50c. up to 6c., depending on quantity and delivery wanted.

Plates.—It is now stated that the Carnegie Steel Co. alone is furnishing about 60,000 tons of steel plates per month to the Government, and this quantity may be increased before very long. It is impossible to quote accurately prices on plates, as each sale made depends entirely on whether the buyer is a regular customer of the mill, the quantity wanted and the delivery. No orders are being placed for steel cars, and the steel car builders cannot get plates from the mills to build cars already on their books. It is said that the two leading steel car interests are not getting more than 25 per cent of the plates they actually need. We now quote ¼ in. and heavier sheared plates at 9c. to 10c. at mill for delivery in third and fourth quarters, while small lots from warehouse for fairly prompt delivery bring 12c. and higher. Mills are quoting 10c. to 12c. on ship plates to domestic yards. The above prices apply only on domestic orders, Government purchases being at much lower figures.

Tin Plate.—Conditions in this trade are the same as noted last week. The mills now believe they will be able to meet the expected abnormal demand for bright plate to be made into containers for perishable foods and are bending every energy they possibly can to achieve this result. At the recent wage conference at Atlantic City, N. J., between tin plate mills that sign the Amalgamated scale and officials of the Amalgamated Association, the latter were sounded on the question as to whether the Amalgamated tin plate mills would work on Sundays to help out the Government demand, and the answer was that, if absolutely necessary, it was certain that the men working in the tin plate mills would be loyal enough to do this. It may be that, before long, some tin plate mills may work Sundays, if the steel can be had. On small current orders, primes are selling from stock at about $12 per base box. Nominal prices on terne plate for which the demand is dull are given on page 48.

Sheets.—More and more of the output of all grades of sheets being made by the mills is being diverted to the Government on direct and indirect business. It is said that at present 30 per cent or more of the entire output of sheets is going to the Government and that when the orders for the cantonments are placed, the percentage of output of sheet mills for Government purposes will be close to 50 per cent. Sales of sheets to regular customers are being steadily restricted and a half dozen or more of the leading sheet mills are out of the market as sellers. Premiums over regular mill prices of $10 to $25 per ton are being paid on all grades of sheets for fairly prompt delivery. Mill prices in effect to regular customers are given on page 48.

Iron and Steel Bars.—It is said the Carnegie Steel Co. is now furnishing about 15,000 tons of steel bars per month to the Government and that this amount will shortly be largely increased. Mills are drawing the lines tighter on selling and on conserving as much of their output as they possibly can for the expected Government demand. Most makers of steel bars are sold up for six months to a year ahead. Prices of iron and steel bars being quoted by the mills to regular customers are given on page 48.

Hoops and Bands.—Small lots of steel hoops for fairly prompt shipment are being sold at 5.50c. to 6c., but mill prices to regular customers range from 4.50c. to 5c. One leading maker took a contract last week for a fairly large quantity of steel hoops for indefinite delivery at 4.50c. at mill. Steel bands range from 5c. to 6c. at mill, but sales for fairly prompt delivery have been made up to 7c. at mill.

Muck Bar.—High grade muck bar, made from all pig iron is quoted at about $100 per gross ton, maker's mill.

Wire Rods.—Makers report the new domestic demand for wire rods is heavy, and there also is a large export demand, especially from Canada. We note a sale of 500 tons of soft open-hearth rods for fairly prompt shipment at $95 per gross ton, maker's mill. One leading interest covered its regular customers some time ago on soft Bessemer and open-hearth rods at considerably under this price. We also note a good demand for high carbon rods made from special steel. There would be no trouble in getting $100 and higher, per gross ton at maker's mill for soft Bessemer or open-hearth rods for export shipment, if the mills could spare them. Prices are given in detail on page 48.

Wire Products.—The order recently placed by the Government for wire nails was 41,320 kegs, of which the American Steel & Wire Co. took half and the other half was divided among six or seven independent mills. The price was $3.20 base, per keg, f.o.b. at mill, deliveries to be made in about 60 days. The demand for wire nails is fairly heavy. All the leading makers are refusing to take contracts, and instead are selling wire nails for indefinite delivery, the price to be paid to be that in effect by the mills to jobbers at the time shipments are made. In this way, the independent mills are protecting themselves in case the market should be

higher when shipments are made, and the jobber is protected should the price be lowered. There is a heavy export demand for wire nails, this coming largely from South America, Japan and Australia.

There is still some confusion among jobbers of wire and wire nails in large cities over the fact that the prices of wire products being charged to its regular trade by the American Steel & Wire Co., is $16 per ton less than the independent mills are quoting. Reports that wire nails had sold by the mills at $5 base, per keg are untrue. None of the mills is quoting above $4 base, per keg, at mill. Detailed prices on wire and wire nails in effect by the independent mills are given on page 48.

Shafting.—Makers report the new demand for shafting heavy, and some large contracts are said to have been placed lately by motor concerns which have taken contracts to build motor trucks and other vehicles for the Government. This new business is expected to more than offset the falling off in new demand for shafting from builders of pleasure cars. The implement makers are specifying at only a fair rate, but the screw stock machine people are taking in shafting as fast as it can be shipped. Local makers are pretty well covered over the remainder of this year. Deliveries of ¾-in. and smaller can be made in 60 to 90 days, but on ¾-in. to 3½-in. and 4-in. not earlier than four to five months. Discounts on cold rolled shafting are firm, ranging from list to 10 and 5 per cent off, depending on the order and deliveries wanted.

Railroad Spikes and Track Bolts.—In the railroad spike market, it is not so much a question of prices, as of where to get the steel to make them. One leading maker that has its own steel, is out of the market as a seller this year, and other makers are not getting more than 20 to 25 per cent of normal needs of steel. New inquiry is heavy, some of the leading railroads asking prices on contracts for delivery in first half of 1918. A heavy general advance in prices on all kinds of spikes has taken place, and contracts have been at 5c. per lb. on 9/16-in. and larger, and 7c. per lb. base on smaller sizes. Boat spikes to regular customers are being furnished at 7c. but there is an abnormal inquiry for boat spikes coming to local makers which they are turning away as they cannot get enough steel for boat spikes to supply regular customers.

Many former users of 5/16-in. spikes are now using ⅜ in. Prices on track bolts are also higher, due to inability of makers to get steel. The new higher prices on railroad spikes and track bolts are given in detail on page 48.

Cold Rolled Strip Steel.—It is said that 60 per cent of the users of cold rolled strip steel are furnishing material indirectly for the government. The new demand is heavy, but there is a disposition on the part of users of cold rolled strip steel not to buy too far ahead, owing to the uncertainty of the future. This also prevails with the mills to some extent and they are confining sales to delivery within 60 days and are still insisting that 50 per cent of the specification on any contract placed must accompany contracts, and the other 50 per cent must come forward in 30 days. On contracts of this kind, mills are quoting 9c. at mill, while on small current orders, prices range from 10 to 12c., at mill. Terms are 30 days net, less 2 per cent off for cash in 10 days, sold in quantities of 300 lbs. or more.

Nuts and Bolts.—Makers of nuts and bolts were in conference last week, discussing trade conditions, but made no changes in prices, the discounts on nuts and bolts as adopted on April 12 last still being in effect. The new demand is heavy, but makers of nuts and bolts report the supply of steel from the mills is getting less, and this is cutting down output of nuts and bolts very much. No attention is paid to export demand, as makers do not have the nuts and bolts to spare, and in addition it is impossible to get cars and bottoms for export shipments, discounts as adopted on April 12, last are given in detail on page 48.

Rivets.—The new demand is heavy, and the recent advance in price of $10 per ton is holding firm. Makers of rivets report they are not getting nearly as much steel as they need and the supply is getting shorter. Prices on structural rivets for delivery up to Oct. 1, only are $5.25 per 100 lb., base, and on cone head boiler rivets $5.35 base, per 100 lb., f.o.b. Pittsburgh. Terms are 30 days net, or one half of 1 per cent off for cash in 10 days.

Wrought Pipe.—The Reading Iron Co., Reading, Pa., and A. M. Byers, Inc., Pittsburgh, have issued new cards on wrought iron pipe, showing heavy advances in price. Discounts on ⅛-in. to ½-in. have been lowered 7 points, an advance of $14 per ton; ¾-in. to 6-in. 5 points, an advance of $10, and 7 to 12-in., 7 points, an advance of $14 per ton. New cards have been issued on steel pipe during the past week, and there has been for some time a very wide range in prices on steel pipe being quoted by the different mills. The National Tube Co. is still using the discounts of April 1, which are $12 per ton less than some of the independent mills, and $28 to $38 per ton less than prices being named on steel pipe by Labelle Iron Works and Wheeling Steel & Iron Co. The fact of the matter is that any sales of iron or steel pipe being made are largely at whatever prices mills care to name. The National Tube Co. is not seeking new business, and has not been for months, trying as best it can to take care of its regular customers on the April 1 discounts. Other independent mills are quoting to regular customers the discounts of May 1, while Labelle and Wheeling are quoting the discounts which these two mills recently adopted. Very little iron or steel pipe remains to be sold this year, the mills being practically covered up to Jan. 1, and several makers of iron and steel pipe have contracts to be filled early next year. This same condition applies on oil country goods, the new demand for which is abnormally heavy. Prices on oil country goods depend entirely on whether the buyer is a regular customer, how soon he wants the material and the quantity. Nearly every sale made carries heavy premium prices. On butt weld iron and steel pipe, mills cannot make deliveries in less than 10 to 12 weeks. There are still large inquiries for gas and oil lines, but these are being turned down, as the mills, in their congested condition, cannot possibly supply the pipe. The new discounts in effect on iron pipe and those on steel pipe adopted May 1, still being quoted by some of the mills, are given on page 48.

Boiler Tubes.—Conditions in the boiler tube trade show no change. Mills are sold up for 6 to 12 months, and any sales of iron or steel tubes carry very heavy premiums in prices. It is said that both iron and steel tubes have sold at $50 per ton advance over prices indicated in the nominal discount which long ago became obsolete. The Government is making very large demands on the mills for both iron and steel tubes, and these contracts are being shipped out as fast as the mills can make the material. On seamless steel tubing, one leading maker is practically sold up, not only for this year, but for nearly all of next year. Nominal discounts on iron and steel tubes, which are very much below the actual prices being paid, are given on page 48.

Old Material.—The local scrap market has quieted down very materially in new demand, and for the past week very little material has been moving from dealers to consumers. Prices are softer, and on most grades of scrap have gone off from $1 to $3 per ton, the heaviest decline having been in steel melting scrap, which is $3 to $4 per ton lower. Some dealers here believe the Government is going to take hold of the scrap situation, and regulate prices, and for this reason dealers are not anxious to sell, and consumers are pretty well covered ahead and are not buying until they know more definitely what the Government is going to do. There is an insistent heavy demand for low phosphorus melting stock, also for borings and turnings, and for sheet bar crop ends, and prices on these grades have declined less than on other kinds of scrap. The scrap list of the Pennsylvania railroad, east, closed Tuesday, July 3, while the list of the Pennsylvania lines west closes July 6, but local dealers have not bid on either lists; in fact, are not buying or selling scrap until the situation as to what the Government will do has cleared to some extent. The be-

lief is that prices may decline still further, if the present inactivity should last for any length of time. We note a sale of six hundred tons of low phosphorus plates and billet ends at $56 per gross ton delivered to consumer's mills. Prices for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, are as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$42.00 to $43.00
No. 1 foundry cast	36.00 to 38.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	46.00 to 48.00
Hydraulic compressed sheet scrap	34.00 to 35.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mill, Pittsburgh district	28.00 to 29.00
Bundled sheet stamping scrap	25.00 to 26.00
No. 1 railroad malleable stock	36.00 to 37.00
Railroad grate bars	19.00 to 20.00
Low phosphorus melting stock	58.00 to 60.00
Iron car axles	58.00 to 60.00
Steel car axles	60.00 to 65.00
Locomotive axles, steel	63.00 to 65.00
No. 1 busheling scrap	32.00 to 33.00
Machine-shop turnings	21.00 to 22.00
Old carwheels	39.00 to 40.00
Cast-iron borings	22.00 to 23.00
*Sheet bar crop ends	55.00 to 58.00
No. 1 railroad wrought scrap	45.00 to 46.00
Heavy steel axle turnings	29.00 to 30.00
Heavy breakable cast scrap	32.00 to 33.00

*Shipping point.

Coke.—The scarcity of cars and the heavy demand for blast furnace coke for prompt shipment have put up prices very rapidly, and in the last few days high grade blast furnace coke for delivery to eastern furnaces shipped over the Pennsylvania railroad has sold at $16, and for delivery to Mahoning and Shenango blast furnaces over the Pittsburgh and Lake Erie railroad has sold at $14.50 to $15 per net ton, at oven. There is an insistent demand for all the blast furnace coke that is offered. One large consumer in the Chicago district has been buying very freely for some time and offering practically any prices that producers ask to get the coke. Some very large contracts for blast furnace coke expired June 30, and these have not been renewed. Instead, shippers on these contracts have agreed to furnish regular customers with coke, prices to be fixed from month to month. This is resulting in a very large demand for prompt coke and still higher prices are predicted. The car supply is bad, having averaged less than 60 per cent last week. We now quote best grades of blast furnace coke for prompt shipment at $15 to $16 per net ton, at oven, but we omit prices on contract blast furnace coke as nothing is being done. We quote best grade of 72-hour foundry coke for prompt shipment at $13 to $14 and on contracts made some time ago, $10 per net ton, at oven. The *Connellsville Courier* gives the output of coke in the upper and lower Connellsville regions for the week ending June 23 as 361,661, an increase over the previous week of 7209 tons. The output this week in the upper and lower Connellsville regions will no doubt show a large falling off as compared with last week, owing to the holiday on the Fourth of July. Coke workers are likely to lose two or three days on account of this holiday.

Chicago

CHICAGO, July 2.

Little change is discernible in this market. The producers of steel are still awaiting information as to what portion of the Government needs will be assigned to them individually. One Western mill has been called on to supply 16,000 tons of plates, shapes and bars as a part of its quota. Even at present prices, a great deal of business could be had were the mills ready to accept it. Agricultural interests are inquiring for miscellaneous material, largely bars and small shapes for first half 1918 delivery. Later the mills will figure on these inquiries, but first they want to hear from the Government. Oriental buyers are finding this market a more precarious source of plates. Steel men here expect that export licenses ultimately will be issued by the Government. Not a single structural award was announced this week. Standard railroad spikes are up one-quarter cent to 4.25c. Southern furnaces are getting most of the business in pig iron, all grades of which are firmly held at the prices of last week. In old material, declines are general in a quiet market.

Pig Iron.—Quotations stand generally at the levels of a week ago. As compared with the activity of a few weeks ago, the market is quiet, although a few fair-sized inquiries are current. Business has been largely centered in Southern iron, although its sellers have drawn the lines tighter around last half deliveries. The plan of the leading Southern producer is to sell a standard No. 2 only in conjunction with quantities for first-half delivery, in which case it quotes $49, Chicago. Sales of last-quarter iron have been made on this price and basis. About 6000 tons of prompt low silicon Southern have been sold at $44.50 Birmingham, a local pipe company taking 3000 tons of July and a plow company 1500 tons at this price. Other makers have obtained $49.50 Birmingham for last-quarter iron running 1.75 per cent silicon and over. The leading Southern producer offers various grades as follows: Silicon, 3 per cent and over, $46.50, Birmingham; 2.75 and over, $46; 2.50 and over, $45.50; 2.25 and over, $45; 2 per cent and over, $44.50, and 1.75 and over, $44.25, all for first half of 1918. Jackson County 8 per cent silvery is nominal at $70 to $80, furnace. Tennessee 8 per cent is around $57.75, Chicago. Charcoal iron is unchanged, with a limited quantity still obtainable for last half and first half. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer, and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 1 to 4	$57.00 to $62.00
Lake Superior charcoal, Nos. 5 and 6 and Scotch	57.00 to 62.00
Northern coke foundry, No. 1	55.50
Northern coke foundry, No. 2	55.00
Northern coke foundry, No. 3	54.50
Northern high-phosphorus foundry	55.00
Southern coke No. 1 f'dry and 1 soft	49.50
Southern coke No. 2 f'dry and 2 soft	49.00
Malleable Bessemer	55.00
Basic	55.00
Low-phosphorus	85.00
Silvery, 8 per cent	70.00 to 80.00

Sheets.—The Government requirements for sheets are giving considerable concern to the mills, representatives of which leave for the East today to attend a meeting at which the situation will be discussed. The leading Western maker is not quoting. One other puts No. 28 black at 9c., Pittsburgh; No. 10 blue annealed at 8.75c., and galvanized at 11c. September delivery, and a small tonnage to sell. The jobbers have made no changes in their quotations.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 9.50c.; No. 28 black, 9.50c.; and No. 28 galvanized, 11c.

Rails and Track Supplies.—Tie plates have been advanced to $70, Chicago; standard railroad spikes to 4.25c. base; small spikes to 4.50c. base, and track bolts to 5.25c. base. There is some inquiry for fastenings, but in the aggregate it is not great. For rails inquiry is small.

Quotations are as follows: Standard railroad spikes, 4.25c. base; small spikes, 4.50c., base; track bolts with square nuts, 5.25 c., all in carloads, Chicago; tie plates, $70 f.o.b. mill, net ton; standard section Bessemer rails, Chicago, $38, base; open hearth, $40; light rails, 25 to 45 lb., $65; 16 to 20 lb., $66; 12 lb., $67; 8 lb., $68; angle bars, 3.25c., base.

Rivets and Bolts.—As a result of the growing strength of the situation and the smaller production because of shortages of labor and materials, the leading interest has advanced its prices 10 per cent. Other makers have yet to follow and the following mill and jobbing quotations are unchanged:

Mill quotations are without change, as follows: Carriage bolts up to ⅞ x 6 in., rolled thread, 40; cut thread, 35-2½; larger sizes, 25; machine bolts up to ⅞ x 4 in., rolled thread, with hot-pressed square nuts, 40-10; cut thread, 40; large size, 30; gimlet-point coach screws, 45; hot-pressed nuts, square, $2 10 off per 100 lb.; hexagon, $1.90 off. Structural rivets, ¾ to 1¼ in., 5.439c., base, Chicago, in carload lots; boiler rivets, 10c. additional

Store prices are as follows: Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ⅞ x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to ⅞ x 6 in., 40-2½; larger sizes, 30-5 hot-pressed nuts, square, $3, and hexagon $3 off per 100 lb.; lag screws, 50 per cent off.

Ferroalloys.—For early delivery 80 per cent ferromanganese is quoted at $450, and for the first half at $400. Ten per cent Bessemer ferrosilicon has been bought at $100, Jackson County furnace.

Plates.—Only one producer names a quotation for plates, and that mill is taking some business at 10c., delivery in the third quarter. Common tank plates range up to 11c., Pittsburgh. Where Oriental shipbuilders will get material is a question, although it is expected that the United States Government will take cognizance of their needs and issue export licenses. Government business is not largely in evidence, although a local mill will furnish some plates on a requisition for 16,000 tons of steel, including plates, shapes and bars.

We quote for Chicago delivery of plates out of jobbers' stocks, 5c.

Structural Material.—Not a single structural job is reported for the week just ended, neither is there any new car business. Only one mill quotation is available and that is supplied by an Eastern producer which quotes 6c., Pittsburgh, for limited quantities, third quarter delivery. The quotation of jobbers is unchanged.

Jobbers quote 6c. for material out of warehouse.

Bars.—The one quotation obtainable for mild steel bars is 4.50c., Pittsburgh, taking a freight rate of 0.189c. per 100 lb. Rail carbon bars are stronger at 4.50c. to 4.75., Chicago. Iron bars are held at 4.50c. to 5c., some makers asserting they have none to sell even at the higher price. Jobbers' quotations are unchanged.

We quote prices for Chicago delivery as follows: Soft steel bars, 4.50c.; bar iron, 4.50c. to 5c.; reinforcing bars, 4.50c., base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting list plus 5 per cent to plus 10 per cent.

Wire Products.—The leading interest adheres to its nominal quotation, 3.20c. for wire nails, and corresponding prices for other products. The prices of the independent makers to jobbers, per 100 lb., Pittsburgh, are as follows:

Plain fence wire, Nos. 6 to 9, base, $4.189; wire nails, $4.189; painted barb wire, $4.339; galvanized barb wire, $5.039; polished staples, $4.339; galvanized staples, $5.039; all Chicago, carload lots.

Old Material—The market has turned quiet and the result of its being left severely alone by buyers of all kinds has resulted in declines for nearly every item on the list. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$47.00 to $48.00
Relaying rails	59.50 to 60.00
Old carwheels	37.00 to 39.00
Old steel rails, rerolling	47.00 to 47.50
Old steel rails, less than 3 ft.	49.50 to 50.00
Heavy melting steel scrap	36.00 to 38.00
Frogs, switches and guards, cut apart	36.00 to 38.00
Shoveling steel	34.00 to 36.00
Steel axle turnings	24.00 to 25.00

Per Net Ton

Iron angles and splice bars	$46.00 to $46.50
Iron arch bars and transoms	46.50 to 47.00
Steel angle bars	40.50 to 41.00
Iron car axles	50.50 to 51.50
Steel car axles	49.00 to 50.00
No. 1 railroad wrought	40.00 to 41.00
No. 2 railroad wrought	37.50 to 38.00
Cut forge	36.50 to 37.00
Pipes and flues	28.00 to 29.00
No. 1 busheling	30.00 to 31.00
No. 2 busheling	22.00 to 23.00
Steel knuckles and couplers	41.00 to 42.00
Steel springs	41.50 to 42.00
No. 1 boilers, cut to sheets and rings	26.50 to 27.00
Boiler punchings	36.50 to 37.00
Locomotive tires, smooth	50.00 to 50.50
Machine-shop turnings	19.00 to 19.50
Cast borings	18.00 to 19.00
No. 1 cast scrap	30.50 to 31.50
Stove plate and light cast scrap	21.50 to 22.00
Grate bars	24.50 to 25.00
Brake shoes	24.50 to 25.00
Railroad malleable	33.00 to 33.50
Agricultural malleable	28.00 to 29.00

Cast Iron Pipe.—The United States Government has placed 300 tons with the United States Cast Iron Pipe & Foundry Co. for the naval training station at Great Lake, Ill. The order was placed with no delay and in a manner that indicated knowledge of the requirements. Livingston, Mont., has placed 1500 tons with the American Cast Iron Pipe Co. Quotations are unchanged.

Quotations per net ton, Chicago, are as follows: Water pipe, 4 in., $68.50; 6 in. and larger, $65.50, with $1 extra for class A water pipe and gas pipe.

Philadelphia

PHILADELPHIA, July 2.

Brisk inquiry in many lines aside from plates, with better business in pig iron, has marked the trade here during the past week. Export inquiry for ship steel is, of course, nothing new, but a development in this line is shown by the increased demand from exporting houses on the Pacific slope for both plates and sheets, presumably for Japanese consumption. On the whole, a considerable tonnage is involved in these inquiries, subject, no doubt, to a good deal of duplication, but mills in this district have dismissed them from consideration, in view of the tremendous need for ship materials in this country on Government and private account. As a sidelight on shipyard activity, a Philadelphia office has received considerable inquiry for ship spikes, the total wants being about 3000 kegs.

Pig Iron.—Normal relations of standard grades have been altered decidedly in a week of better sales, accompanied by advancing prices. The market is active and strong, with numerous inquiries running from 300 to 1500 tons on foundry grades. Virginia iron, with important makers out of the market, is now distinctly ahead of eastern Pennsylvania No. 2 X, sales this week being reported at $52.50, furnace, equivalent to $55.25, Philadelphia, against $54.50 as an extreme top for eastern Pennsylvania No. 2 X. At this price eastern Pennsylvania iron is a little high, and the real market cannot be said to run above $54. Philadelphia, as of today. There is talk of anything from $54.75 to $56.75 as the delivered price of eastern Pennsylvania No. 2 X, but the substantial tonnages which have actually been moving have not reached such figures. Standard low phosphorus has established an actual price of $90 in sales upward of 10,000 tons, while copper-bearing low phosphorus is held at $80 to $85, furnace, for first half delivery. Basic iron is temporarily in the doldrums, as steel makers are apparently covered, and in the absence of transactions it is held at a nominal quotation of $50 to $52. Some fair tonnages of eastern Bessemer have been sold recently at $60, furnace, and a round tonnage of coke malleable was disposed of in this market at $58.50, delivered. Charcoal iron, whether Lake Superior or Southern, seems to be firm at $60, furnace. Some small sales of No. 2 foundry at $47, Birmingham, for last half delivery are reported. One quotation on this grade for 1918 delivery was given to-day as $42, Birmingham, while $52, furnace, was cited as the idea of one house on eastern Pennsylvania No. 2 X for 1918 delivery. As a whole, sellers are not eager to make commitments very far forward in view of the uncertainty prevailing as to fuel supply and other elements of manufacture. Quotations for standard brands, prompt shipment, and delivery in buyers' yards, range about thus:

Eastern Pa. No. 2 X foundry	$52.00 to $54.00
Eastern Pa. No. 2 plain	51.50 to 53.50
Virginia No. 2 X foundry	54.25 to 55.25
Virginia No. 2 plain	53.75 to 54.75
Basic	50.00 to 52.00
Gray forge	50.00
Standard low phosphorus	90.00

Iron and Steel Bars.—Good tonnages from widely distributed interests are reported for the week by makers of bar iron, for delivery at mill convenience. The price range is maintained, most makers quoting 4½c. base, Pittsburgh, though one maker is quoting 5c. and keeping busy. Steel bars are still held at 4½c., Pittsburgh, as a minimum, with as high as 5c. asked by one interest.

Structural Material.—Prices on structural steel remain unchanged, with one large interest quoting 4½ to 5c., another asking 6c. on contracts for third quarter specification, and a third large producer out of the

market. The Gerber Engineering Co. is to supply approximately 1000 tons for the new office building to be erected in Chestnut Street on the site of the Chestnut Street Theatre, and an inquiry is in the market for from 700 to 1000 tons for an office building in Washington, intended for the use of Government departments.

Plates.—There is no mistaking the position of plates as the headliner in the steel market. Old customs have reversed themselves, so that buyers are now trying to make prices with a view to tempting the mill to take their orders. One inquiry covering 13,000 tons for export, of which 3000 tons was for France, failed to get a quotation from the mill approached. Another maker reports export inquiries of 2000 to 5000 tons from Japan, Italy, Spain and Norway. The minimum price for ordinary tank steel is still 10c. base, Pittsburgh, but orders have been reported at 10½c. and upward, depending upon specification and delivery. Boat steel likewise holds to 12½c. as the minimum, but it is reported that some business has been placed at 15c. base. American shipyards have placed no new business with mills for some time, this being due to the fact that they are busy filling Government requirements. It is hard to get any promise of delivery earlier than a year, and plate users are evincing uneasiness lest they be seriously affected if the Government takes a large share of the mill output. Last week was marked by very heavy specifications, literally swamping the mills, since many contracts had June 30 as the limit and buyers were eager to save every pound of tonnage contracted for at prices lower than the present basis.

Sheets.—Mills in this district are really marking time and selling virtually nothing until the probable Government needs are fully known. Some Government tonnage is being specified, with prospects of more. The minimum of 8½c. Pittsburgh for No. 10 blue annealed still obtains, with 8¾c. as an outside price.

Ferroalloys.—Ferromanganese is quoted to-day at $450 for prompt, $425 for last quarter and $400 for first quarter 1918. Spiegeleisen is held at $85 furnace for prompt delivery, with the market strong. A price of $105 on 10 per cent Bessemer ferrosilicon for July shipment was reported to-day.

Track Supplies.—Standard spikes, hitherto held at 4c. base, Pittsburgh, were quoted to-day at 4¼c. by one interest on the ground that spikes should not be listed at a price below steel bars. An inquiry for 1000 kegs to cover the needs of the United Railways & Electric Co. of Baltimore has been in this market. Tie plates are being held at 4½c. Pittsburgh, with 5c. asked on small lots.

Old Materials.—Shipments of old materials to Pittsburgh, while they have by no means ceased, have diminished and the market seems more settled, though still inclined to be spasmodic at times. While there was considerable softening here and there, indications of added strength are not altogether wanting. Eastern mills as a whole are not buying freely, though sales of steel melting scrap approximating 10,000 tons, at $40 have been reported. Cast borings, on two sales close together, showed a gain of $2 during the week, the price of $27 on the first sale mounting to $29. Sales of machine shop turnings at $27.50 have been made during the week and old car wheels have shown added strength. Prices to-day, based on Eastern Pennsylvania delivery, range about thus per gross ton:

No. 1 heavy melting steel	$40.00 to $42.00
Old steel rails, rerolling	50.00 to 55.00
Low phosphorus heavy melting	56.00 to 58.00
Old iron rails	52.00 to 55.00
Old carwheels	38.00 to 40.00
No. 1 railroad wrought	57.00 to 59.00
No. 1 forge fire	26.00 to 28.00
Bundled sheets	26.00 to 28.00
No. 2 busheling	18.00 to 20.00
Machine shop turnings	26.00 to 28.00
Cast borings	27.00 to 29.00
No. 1 cast	39.00 to 41.00
Grate bars, railroad	22.00 to 25.00
Stove plate	22.00 to 25.00
Railroad malleable	32.50 to 35.00
Wrought iron and soft steel pipe (new specifications)	40.00 to 42.00

Coke.—Spot fuel is genuinely scarce, and important dealers confess inability to command supplies or to quote on inquiries. Forward contracts are reported on a basis of $12.50 to $13, oven, for foundry coke. The same grade was quoted to-day at $16 for spot, with furnace coke at $15.

Cleveland

CLEVELAND, July 2.—(*By Wire.*)

Iron Ore.—Ore men feel that in view of the present conditions of the pig iron and steel market they should get higher prices for any ore they have left for sale for this season. In one case, quotations higher than regular market prices are reported to have been made and one leading shipper is declining to make quotations, while waiting developments in respect to Government regulation of prices. A number of inquiries are pending, but only a limited additional tonnage can be sold owing to the lack of vessel capacity. The car shortage is still very bad and this is causing considerable delay of boats at Lake Erie docks. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, $5.95; Mesaba Bessemer, $5.70; old range non-Bessemer, $5.20; Mesaba non-Bessemer, $5.05.

Pig Iron.—There is a moderate volume of inquiry and apparently a shortage of both steel making and foundry iron for this year's delivery. One leading producer is making no quotations in view of possible action by the Government to regulate prices. The General Electric Co. is inquiring for foundry, malleable and basic iron, mostly for its first half requirements and is expected to purchase 15,000 to 20,000 tons. The Erie Forge Co., Erie, Pa., will install an additional open-hearth furnace and is inquiring for 10,000 tons of basic iron for the last quarter and first half. A leading sanitary interest has purchased about 15,000 tons of Northern and Southern iron for first quarter delivery. The price of foundry iron has been advanced to $56 for any delivery by two Lake furnaces. Southern iron is fairly active. Considerable tonnage was booked during the week at $45 Birmingham for No. 2 for first half delivery. Tennessee iron is being quoted as high as $50 for that delivery. A number of sales of Virginia iron were made in the Cleveland territory during the week at prices ranging from $53.20 to $55.20 for No. 2 for first half delivery. A Valley mill has taken 1000 tons of Ohio silvery, 8 per cent silicon, for July and August delivery at $85 furnace. This iron is now quoted at $80 furnace for delivery during the first half. We quote f.o.b. Cleveland as follows:

Bessemer	$57.95 to $58.95
Basic	52.30 to 54.30
Northern No. 2 foundry	54.30 to 56.30
Southern No. 2 foundry	49.00 to 54.00
Gray forge	50.95
Ohio silvery, 8 per cent silicon	81.62 to 86.62
Standard low phos., Valley furnace	83.00 to 85.00

Coke.—Foundry coke has advanced to $14 to $15 for standard Connellsville makes for prompt shipment and several sales are reported around $14.50. No prices for contracts are being made.

Finished Iron and Steel.—Interest in the steel market is centered almost wholly in Government orders and there is an increasing anxiety among consumers not doing Government work as to whether they will be able to get their steel. Inquiries have come from manufacturers as to whether they can depend on the mills for shipments on fourth quarter contracts. Few consumers allowed any steel on second quarter contracts to be canceled. Inquiries for steel for Government work have increased and include one for 5000 tons of nickel steel for gun forgings, one for steel for 58,000 4 to 6 in. and larger shells taken by an Ohio manufacturer, 1800 tons of structural material for mine storage houses and 250 tons for helmets. An interesting feature of the market is the heavy demand for electric steel. Three months ago there was a surplus of this steel and it was being shipped on open-hearth specifications. Now makers are four months behind on deliveries. The greater demand is partly attributed to Government requirements. Sales during the week in-

cluded two lots of electric steel of 500 tons each. The plate market is very firm at 12c. to 12½c., Pittsburgh. Plate mills are having much trouble in getting raw material and in shipping their products. In semi-finished steel we note a sale of 1000 tons of ingots by a Cleveland district mill at $70 and several car lots of forging billets at $130. The demand for both light rails and standard sections from industrial companies is heavy, and there is an acute shortage. Hard steel bars have been advanced to from 4c. to 4.25c. The sheet market is very firm and active, although some jobbers expecting Government regulation of prices are deferring purchases. We quote sheets at 8.50c. to 8.65c. for No. 28 black, 8.50c. to 8.75c. for No. 10 blue annealed and 10.50c. to 10.75c. for No. 28 galvanized. Warehouse stocks were greatly depleted during June and sales fell off slightly. The warehouse price on blue annealed sheets has been advanced to 9c. Other stock prices are unchanged.

Bolts, Nuts and Rivets.—The new demand for bolts and nuts is very heavy, having been stimulated by the Government requirements from makers of motor trucks, wagons and other equipment. These manufacturers so far are not being given price concessions for bolts and nuts to be used in Government work. New business is being placed at the price advance made by Cleveland manufacturers last week. Cleveland rivet manufacturers have advanced prices to conform with those recently made in the Pittsburgh territory. The demand for rivets is very heavy, a large volume of business being placed by ship-building companies which are accompanying their orders with specifications. There is an increased demand for export. On the Government inquiry for 40,000 tons of rivets for boats, rivet manufacturers have quoted a price for conversion, this being a fixed amount above the price at which they are to be furnished the steel and it is expected that the matter will be settled this week. We quote rivets at 5.25c., Pittsburgh, for structural, and 5.35c. for boiler rivets, for delivery during the last half. Bolt and nut discounts are as follows:

Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 35 off; cut thread, 30 and 5; larger or longer, 20. Machine bolts, with h. p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 40; cut thread, 35; larger and longer, 25. Lag bolts, cone point, 40. Square h. p. nuts, blank, $1.90 off list; tapped, $1.70 off list. Hexagon, h. p. nuts, blank, $1.70 off; tapped, $1.50 off. C. p. c. and t. hexagon nuts, all sizes blank, $1.25 off; tapped, $1 off. Cold pressed semi-finished hexagon nuts, 50 and 5 off.

Old Material.—Following the advance in prices and feverish activity, the market has reacted. The weakening is attributed partly to a falling off in the demand, mills having withdrawn from the market after purchasing round tonnages, but, apparently, caused principally by the feeling among dealers that the Government may step in and regulate prices of scrap with other raw material. Last week, sales of heavy melting steel scrap were made at $45, to Cleveland mills, but the price to-day is around $43. This grade is quoted at $44 to $45 for delivery to Valley points. The softening of the market has brought out a large amount of heavy steel scrap. The Cromwell Steel Co., Lorain, is a new scrap buyer in this territory, having purchased 12,000 tons of heavy steel and being in the market for an additional tonnage. Borings and turnings are easier, but other grades are fairly firm. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Steel rails	$44.00 to $45.00
Steel rails, rerolling	48.00 to 50.00
Steel rails, under 3 ft	47.00 to 50.00
Iron rails	48.00 to 50.00
Steel car axles	55.00 to 57.50
Heavy melting steel	43.00 to 44.00
Carwheels	40.00 to 41.00
Relaying rails, 50 lb. and over	50.00 to 55.00
Agricultural malleable	29.00 to 31.00
Railroad malleable	42.00 to 44.00
Light bundled sheet scrap	24.00 to 25.00

Per Net Ton

Iron car axles	$55.00 to $60.00
Cast borings	20.50 to 21.50
Iron and steel turnings and drillings	19.50 to 20.00
No. 1 busheling (nominal)	30.00 to 32.00
No. 1 railroad wrought	44.00 to 45.00
No. 1 cast	33.00 to 35.00
Railroad grate bars	22.50 to 23.50
Stove plate	21.00 to 22.00

The contract for about 26,000 tons of steel that will be required for 4,750,000 shell forgings that will be made for the Government by the Hydraulic Pressed Steel Co., Cleveland, has been divided between the Lackawanna Steel Co., Cambria Steel Co., the Inland Steel Co., the Minnesota Steel Co., and the Bourne-Fuller Co.

Cincinnati

CINCINNATI, July 2—(*By Wire*).

Pig Iron.—Southern foundry iron for nearby shipment has sold freely at $50 Birmingham, and confirmation has been received that the 15,000 tons of basic for first half shipment mentioned last week was sold at this same price. As far as known, no foundry iron has been bought at $50 for first half shipment, but a number of contracts have been made at $48. The minimum quotation to-day on Southern for this year is $47. Northern foundry is almost unobtainable for any shipment this year, and the furnaces are not very keen to take on much business for the first half of next year. Last week, $54, Ironton, on No. 2 foundry was done for first half shipment, but to-day's quotation is firm at $55 for shipment during the remainder of the year, and in the first half of next year. Virginia iron was offered in this territory at $50, furnace, for first-half shipment, and several contracts were made at this figure by melters in Ohio, Indiana and Michigan. The furnace making this quotation withdrew from the market early last week. A small sale of Virginia iron, running 3 per cent in silicon, was made to-day for this year's shipment at $52.50, furnace. The Ohio 8 per cent silvery irons are now quoted at $85 to $90, furnace, for first-half shipment, and 10 per cent Bessemer ferrosilicon is firm at $105, at which price some was recently sold. There is a limited demand for malleable, but it is very firm at $55, Ironton, for shipment either this year or first half of next. A number of melters are inquiring for prices on iron to be shipped in the last half of next year, but the furnaces are not willing to open their books that far ahead. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, for 1917 shipment, as follows:

Southern coke, No. 1 f'dry and 1 soft.	$51.40 to $52.40
Southern coke, No. 2 f'dry and 2 soft.	$49.90 to 51.90
Southern coke, No. 3 foundry	50.40 to 51.40
Southern coke, No. 4 foundry	50.00 to 51.00
Southern gray forge	48.90 to 49.90
Ohio silvery, 8 per cent silicon	81.26
Southern Ohio coke, No. 1	56.76
Southern Ohio coke, No. 2	56.26
Southern Ohio coke, No. 3	55.76
Southern Ohio malleable Bessemer	56.26
Basic, Northern	56.26
Lake Superior charcoal	56.75
Southern carwheel foundry	48.90

Finished Material.—The local store price on blue annealed sheets has been advanced ½c., making to-day's quotation 9½c. a lb. The demand for blue annealed sheets is very good, and mill shipments are moving at a better rate. The call for galvanized sheets is becoming more limited, as sheet metal contractors find it hard to obtain fair prices on all kinds of contract work, and as a consequence their activities just now are mostly confined to repair jobs. The nearby mills are quoting No. 28 black sheets at 8.15c. Cincinnati, or Newport, Ky., and No. 28 galvanized at 10.15c. Plates, ¼ in. and heavier are unchanged at 9c. from warehouse stocks, and structural shapes at 5c. Steel bars are unchanged at 4.65c. and twisted steel bars at 4.70c. Machine bolts, ⅜ x 4 in. and smaller are quoted at 45 per cent discount; larger and longer, 30 per cent; files, 50 per cent discount; hacksaw blades 10 per cent discount and hand taps at 55 and 7½ per cent discount. Rivets have been advanced about 20 per cent in the past 30 days. The warehouse price on wire nails remains at $4 per keg base, which is 15c. per keg below the present mill price as quoted by independent manufacturers. A price advance to $4.25 is scheduled for the present week.

Coke.—Spot foundry coke is very strong, and some 72-hr. coke in the Connellsville field has brought as

high as $15 per net ton at oven. Prompt shipment foundry coke is quoted at $13.50 to $15. Contract figures are from $11.50 to $13. In the New River district, spot foundry coke ranges from $13 to $14, and in Wise County and Pocahontas fields prices are from $12.50 to $13.50. In all four fields, contract prices are from $11.50 to $13, with very little contracting being done. Furnace coke is very firm for prompt shipment, and lately contract prices also appear to be on the upward trend. We quote for prompt shipment $11 to $12 per net ton at oven and on contract $9.50 to $11. Very little furnace coke is being bought, although for domestic uses carload quantities are sold from time to time, usually bring the maximum quotation for spot shipment. The car situation is unchanged, and many shipments are delayed.

Old Material.—Prices are not very strong, and a reduction of 50c. a ton has been made on several different kinds of scrap. The rolling mill demand for wrought scrap is somewhat slack, while foundry purchases of cast scrap show a decline. Relaying rails are in excellent demand, and the matter of price does not seem to have cut off buying on the part of customers who need rails. The following are dealers' prices f.o.b. at yards, southern Ohio and Cincinnati.

Per Gross Ton

Bundled sheet scrap	$23.00 to $23.50
Old iron rails	40.00 to 40.50
Relaying rails, 50 lb. and up	45.50 to 46.00
Rerolling steel rails	42.50 to 43.00
Heavy melting steel scrap	40.00 to 40.50
Steel rails for melting	40.00 to 40.50
Old carwheels	36.00 to 36.50

Per Net Ton

No. 1 railroad wrought	$38.00 to $38.50
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	28.00 to 28.50
No. 1 machinery cast	29.00 to 29.50
Burnt scrap	17.00 to 17.50
Iron axles	47.50 to 48.00
Locomotive tires (smooth inside)	42.00 to 42.50
Pipes and flues	22.50 to 23.00
Malleable cast	27.50 to 28.00
Railroad tank and sheet	20.50 to 21.00

Birmingham

BIRMINGHAM, ALA., July 2. (*By Wire.*)

The market for pig iron sold by furnaces is on a basis of $45 for 1918 with the three companies which are in the market. The 1917 basis ranges from $46, the schedule of the leading foundry sells to $50. Brokers do the bulk of the spot business at $48 to $50.

(*By Mail*)

The last week in June was another kaleidoscopic one in the Birmingham iron market. On Monday the leading foundry interest, which had been quoting 1918 delivery at $42 less than a week, during which a considerable tonnage was sold, advanced to $45 for 1917 and 1918 delivery and sold a fair tonnage for 1918. On Friday the 1917 minimum was raised to $46. At the close of the week the leading interest, which had been selling for 1918 at $42.50 and found the trade eager to book at that figure, raised to $45 for 1918. Still another interest made a sale for 1918 delivery in the middle of the week at $43, then withdrew quotations and started booking only upon direct instructions of the head office. Still another company sold a lot of basic for 1917 and 1918 delivery at $50. The furnace men with one accord say they have no spot price, because they have no spot iron. All iron made is due regular customers and they will not quote for spot delivery. The nearest to a spot furnace quotation is that of $46 by the leading foundry iron seller, but that price is for regular customers only. There was a sale of a small tonnage for last quarter at $45. Boiled down, the close of the week showed a 1918 market on a $45 basis with one seller asking more. The company quoting $50 for 1918 for a week had not reported a sale at that figure, but was not soliciting business. As for the spot market the best-informed broker, one making more spot sales probably than any other one, placed it at the close of the week on a minimum of $48 to $50. A furnace operator made this statement: "It is a rather unique situation is it not—our delivering $14 to $16 iron and being forced to turn down firm offers of $50 for spot? We cannot deliver the spot because we have not caught up with our customers." Furnace operators receive daily pleas to secure carload spot lots, which, in turn, they turn over to brokers. It is very seldom that a consumer declines a car offered at $50. Charcoal iron has sold during the week at $55 and tends to advance.

We quote per gross ton f.o.b. Birmingham district furnaces for prompt iron as follows:

No. 1 foundry and soft	$48.50 to $50.50
No. 2 foundry and soft	48.00 to 50.00
No. 3 foundry	47.50 to 49.50
No. 4 foundry	47.25 to 49.25
Gray forge	47.00 to 49.00
Basic	48.00 to 50.00
Charcoal	55.00 to 57.00

Steel bars in car lots f.o.b. Birmingham, 4.50c. to 4.75c.; iron bars, 4.30c. to 4.40c.

Old Material.—The scrap market remains firm at the advances. There has been a decline of 50 cents a ton in some articles in some transactions, but there has not been sufficient uniform difference to warrant change in price schedule. Transactions have been on a large scale. We quote per gross ton f. o. b. Birmingham district yards, prices to consumers as follows:

Old steel axles	$50.00 to $55.00
Old steel rails	37.00 to 40.00
No. 1 wrought	35.00 to 40.00
No. 1 heavy melting steel	25.00 to 27.00
No. 1 machinery cast	27.00 to 28.00
Carwheels	27.00 to 29.00
Tram carwheels	25.00 to 30.00
Stove plate and light	19.00 to 20.00
Turnings	13.00 to 14.00

Cast-Iron Pipe.—The Government pipe business, both water and gas, as well as sanitary, was parcelled out in such manner that nearly all Alabama shops secured a proportion. Manufacture has been rushed and delivery made in a number of instances. The price made the Government was $5 under the regular price. The business has served to keep all plants going well. Recent advances are more firmly established. We quote per net ton f. o. b. pipe shop yards as follows: 4 in., $63; 6 in. and upwards, $60 with $1 added for gas pipe and special lengths.

Coal and Coke.—Current quotations on standard foundry coke for spot shipment are $15 with $12.50 for contracts. The movement to northern Mexican smelters has improved owing to their purchase of freight cars, which the railroads have agreed not to divert, thus establishing a shuttle-train movement between smelter and ovens.

St. Louis

ST. LOUIS, July 2.

Pig Iron.—While increased activity has developed in the pig iron market during the past week, there has been little, practically no, increase in the amount of the transactions as aggregated at the end of the week. The call is both for first half of next year and for early shipment, on the latter of which nearly all furnaces represented in this territory are out of the market. Such transactions as have been closed during the week have been for small amounts and the total probably will not exceed 2500 tons for all deliveries, for although a great number of melters have shown much anxiety to cover needs, present and prospective, they have been halted by the prices which have confronted them when they entered the market. Offers approaching $50, Birmingham, for No. 2 Southern foundry have been turned down by some furnaces during the week, this for prompt shipment, while 1918 delivery has ranged up to that figure with furnaces unwilling to make contracts, at least for any quantity or for any other than old customers. Lake Superior charcoal iron has been sold during the week as high as $60.25, furnace, early shipment, and the price being quoted to-day is $62.50, furnace. Practically all furnaces have been withdrawn from the market for this year's delivery, being sold up to their normal capacity.

Coke.—Coke is just as difficult as pig iron to obtain for early shipment, and Connellsville coke, except for shipment in open top cars, is virtually off the market in this territory. New River coke is being held at $14, ovens, for early shipment for best 72-hour selected.

The coke makers are, apparently, not interested in contracts for future delivery, being more inclined to hold their unsold product for spot shipment at premium prices. Shipments of coke and of pig iron as well are in large volume and the consumption shows no diminution. The by-product situation shows no change from that which has been reported for the last several weeks.

Finished Iron and Steel.—In finished products there have been no future contracts possible, the mill representatives being under instructions to discourage buying for any deliveries until better information can be had as to Government intentions. Stock out of warehouse is growing harder and harder to get, the deliveries to the warehouses being affected both by mill conditions and the car shortage. For stock out of warehouse, we quote as follows, the prices being very stiffly held: Soft steel bars, 4.55c.; iron bars, 4.50c.; structural material, 5.25c.; tank plates, 8.05c.; No. 10 blue annealed sheets, 8.55c.; No. 28 black sheets, cold rolled, one pass, 8.85c.; No. 28 galvanized sheets, black sheet gage, 11.25c.

Old Material.—The scrap market has been getting steadily weaker during the past week, seemingly out of sympathy with the situation due to the uncertainties as to the Government's position in the iron and steel lines and the possibilities regarding price legislation or price fixing. There is, at the present time, literally no market and quotations can only be reported from an estimated value basis rather than as an actual quotation of prices, for no one knows what to pay, neither does the seller know what to ask. The downward tendency has approximated $2 to $3 per ton so far as can be determined in the present state of the market, but the general feeling is that the situation is only temporary and that there will be decided changes as soon as the governmental attitude can be definitely determined. Altogether, dealers regard the present situation as one of indecision rather than as a real market with definite tendencies. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$45.00 to $46.00
Old steel rails, re-rolling	45.00 to 46.50
Old steel rails, less than 3 ft	39.00 to 40.00
Relaying rails, standard section, subject to inspection	50.00 to 51.00
Old carwheels	35.00 to 36.00
No. 1 railroad heavy melting steel scrap	39.50 to 40.00
Heavy shoveling steel	36.50 to 37.50
Ordinary shoveling steel	35.50 to 36.50
Frogs, switches and guards cut apart	39.50 to 40.00
Ordinary bundled sheet scrap	19.50 to 20.00
Heavy axle and tire turnings	21.00 to 22.00

Per Net Ton

Iron angle bars	$36.00 to $37.00
Steel angle bars	33.50 to 34.00
Iron car axles	49.00 to 50.00
Steel car axles	47.50 to 48.00
Wrought arch bars and transoms	41.00 to 42.00
No. 1 railroad wrought	39.00 to 40.00
No. 2 railroad wrought	37.00 to 38.00
Railroad springs	33.00 to 34.00
Steel couplers and knuckles	33.00 to 34.00
Locomotive tires, smooth inside, 42 in. and over	45.00 to 46.00
No. 1 dealers' forge	33.00 to 34.00
Cast iron borings	16.50 to 17.00
No. 1 busheling	27.50 to 28.50
No. 1 boilers cut to sheets and rings	23.00 to 24.00
No. 1 railroad cast scrap	28.00 to 29.00
Stove plate and light cast scrap	17.00 to 18.00
Railroad malleable	27.00 to 28.00
Agricultural malleable	25.00 to 26.00
Pipes and flues	24.00 to 25.00
Heavy railroad sheet and tank scrap	22.00 to 23.00
Railroad grate bars	20.00 to 21.00
Machine shop turnings	18.50 to 19.50

Buffalo

BUFFALO, July 2.

Pig Iron.—Inquiry during the past week has reached a total of nearly 40,000 tons of various grades and for both 1917 and 1918 shipments. Only a small part of this inquiry was quoted on by Buffalo district furnaces, however, and in a large number of instances Buffalo producers did not quote on any of the tonnages asked for, on account of being heavily sold up and their feeling of disinclination to take on further commitments because of the uncertain situation as to future production costs, etc. Where furnaces are quoting for first quarter and first half, the range of prices named is from $50 to $56. Prompt shipment iron is almost a negligible element in the Buffalo market.

We quote as follows for first quarter and first half of 1918 and for such small amounts of 1917 iron as remain available:

High silicon irons	$54.00 to $56.00
No. 1 foundry	53.00 to 55.00
No. 2 X foundry	52.00 to 54.00
No. 2 plain	51.00 to 52.00
No. 3 foundry	50.00 to 51.00
Gray forge	50.00 to 51.00
Malleable	53.00 to 55.00
Basic	53.00 to 55.00
Lake Superior charcoal, f.o.b. Buffalo	55.00 to 60.00

Finished Iron and Steel.—The situation in steel products is about the same as a week ago. Almost no sales are being made, as finished product consumers seem to be satisfied to remain inactive until it is determined what the Government is to do in reference to the fixing of prices. It is believed that approximately 80 per cent of the tonnage that is under inquiry at the present time is either directly or indirectly for Government requirements. Most consumers of steel are buying only in such amounts as are necessary to sort up and equalize their stocks. In wire products and tin plate also, very little material is being quoted on and only such quantities are being purchased as are absolutely required for current use.

Old Material—There has been a break in the market for heavy melting steel, which has caused a drop in price of $4 to $5 per ton. The largest consumers have withdrawn from the market, being apparently covered. The slump in heavy melting is undoubtedly caused by the forecasts of the Government's attitude relative to the fixing of lower prices for steel products. Dealers seem to anticipate further reductions if the present trend is maintained. Although there has been no pronounced development affecting the lowering of prices in other commodities, as yet, the general market is in a rather unsettled condition and prices all along the line will undoubtedly fall off in sympathy with the recession in heavy melting steel. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$38.00 to $39.00
Low phosphorus	55.00 to 60.00
No. 1 railroad wrought	50.00 to 55.00
No. 1 railroad and machinery cast	32.00 to 33.00
Iron axles	55.00 to 60.00
Steel axles	55.00 to 60.00
Carwheels	38.00 to 40.00
Railroad malleable	35.00 to 36.00
Machine shop turnings	21.00 to 22.00
Heavy axle turnings	26.00 to 27.00
Clean cast borings	21.00 to 22.00
Iron rails	45.00 to 46.00
Locomotive grate bars	23.00 to 24.00
Stove plate	23.00 to 24.00
Wrought pipe	35.00 to 36.00
No. 1 busheling scrap	33.00 to 34.00
No. 2 busheling scrap	21.00 to 22.00
Bundled sheet stamping scrap	22.00 to 23.00

San Francisco

SAN FRANCISCO, June 26.

News of the Government's ordering large tonnages of rolled steel products from the mills has caused no little perturbation here. Deliveries have been so uncertain for some time that anxiety is felt among the trade in the matter of filling orders and contracts. On some steel products, prices are quoted by eastern concerns only on delivery, making the future impossible to discount. These conditions are disconcerting to the San Francisco market, which already bears a load of piled up orders. The demand for railroad supplies is very brisk and wire products are called for in larger quantities than can be supplied. The demands of the new shipyards will accentuate the present situation regarding deliveries of material. In addition, the United States Army and Navy requirements for structural material of all kinds are increasing as the military plans develop. Owing to the pre-occupation of European steel manufacturers and the lack of tonnage via the Suez Canal, export inquiries are more numerous than ever known in the past. They emanate from the West Coast of South America and from Oriental points from Vladivostock to Java.

Bars.—Prices are quoted by the local mills on bases that jobbers of eastern material are unable to meet. Steel bars in carload lots are quoted at local mills on a base price of 4.75c.; out of stock at 5.25c. Jobbers quote 3 in. and under structural base at 7.50c.; over 3 in. 7.75c. Coast sizes are on a 6c. base.

Structural Materials.—Outside of shipbuilding and United States Government requirements, the amount of business offering in structural materials is not so large as anticipated. A halt has been called in private construction. Government demands are increasing and the range of requirements for construction work of all kinds and for repairs is very large. Some structural shapes are plentiful in this market, while others are difficult, and in some cases, almost impossible to secure. This has caused a lot of embarrassment and is a hindrance in securing new business. Definite prices can only be had on date of shipment.

Plates.—Plates for shipbuilding are still hard to obtain, owing to the dearth of railroad cars and the over-crowded condition of the mills. The proposed United States Government allotment of supplies to the shipyards will ease the situation somewhat. Tank steel plates are quoted by jobbers on a 10c. base with short stocks and no guaranteed delivery. On ordinary plate specifications for tank work, some mills are offering these for fairly early delivery on a base of $8 to $10 per 100 pounds at shipping point. The Government's construction and repair work is calling for large quantities of plates.

Sheets.—Owing to extraordinary war demands, some jobbers are unable to satisfy the needs of customers. New prices quoted by jobbers here are: 28 gage galvanized sheets, 12.45c.; 28 gage black sheets, 10.49c.; No. 10 blue annealed sheets, 10.50c.; with other sizes advanced in proportion, and further advances expected within the next 30 days. All reports indicate that the problem of replenishment for the market is exceedingly difficult to solve.

Wrought Pipe.—An undersupply of wrought pipe is seriously threatening oil production in this State. Stocks of oil are running short, and without the necessary pipe there can be no exploitation of fresh territory. Railroad transportation will be badly handicapped all along the Coast within the next 90 days if some relief from the oil and pipe shortage is not found. Buyers have been notified by independent manufacturers of advances in wrought pipe. Some of these advances which have not yet been followed by the big producers are: On ⅛-in., ¼-in., and ⅜-in. sizes, $24 per ton; on ½-in., $20; ⅞-in. to 3-in. inclusive, $14; 2½-in. to 6-in. lap weld, $20; 7-in. to 12-in., $26. All reports from mills.

Cast Iron Pipe.—Municipal and private requirements are not large at this time; and only small orders are coming in from these sources. Bids are about to be opened by the United States Navy Department her for 5000 ft. of 6-in. cast iron pipe to be laid under water from the mainland to the Naval Training Station on Goat Island. Bell and spigot cast iron water pipe, Class D, is selling, with delivery in 45 days, at $59 per ton f.o.b. Birmingham, Ala.; and at $63 for immediate foundry shipment.

Pig Iron.—Prices are quoted here for No. 2 foundry pig at an average of from $50 to $55 and for No. 2 foundry Alabama at from $40 to $45. The United States Navy demands for the Mare Island Navy Yard elicited bids for No. 3 foundry grade as follows: Middleboro, $45; St. Louis, $47.50 and Mesabie Valley, f.o.b. St. Louis, $53 per long ton for shipment in one day.

Coke.—So little can be had in this market that, to avoid disappointing delays, one large consumer is using briquettes made from the refuse of the gas retorts of the Pacific Gas & Electric Company, which are said to give satisfaction. Prices range about $20 with no guaranteed delivery.

Old Materials.—With a good demand and prospects of a shortage, dealers are holding for good prices, though these are more or less irregular. Rails command from $23 to $25; country scrap, $20 or a little better, while as high as $32.50 has been paid for heavy melting.

New York

NEW YORK, July 3.

Pig Iron.—The pig iron market in the metropolitan district has been only fairly active and the largest inquiries from melters in the State have been submitted in the Buffalo district, the General Electric Co. being in the market there for 10,000 to 15,000 tons for the last quarter of this year and the first half of next, and the Gould Coupler Co. for 8000 to 10,000 tons of basic for the first half of 1918. Foreign inquiry continues to come in and Japan has succeeded in buying 5000 tons of Alabama iron at about $44.50 Birmingham for No. 2. Italy is not so fortunate on account of the tremendous charges for carrying pig iron to that country, which now range from $90 to $100 per ton. A considerable tonnage of Bessemer purchased some time ago for shipment to Italy has been sold on the basis of about $59 Valley for shipment backward toward Pittsburgh. Prices on eastern Pennsylvania irons again advanced $2 to $3 per ton and for shipment $53 furnace is the usual quotation for No. 2 X and for next year's shipment the iron is quoted at $51 to $52 furnace. Virginia No. 2 X is being sold at $52 furnace for this year and at the same price for next year. We quote tidewater for early delivery as follows:

No. 1 foundry	$53.25 to $54.25
No. 2 X	52.75 to 53.75
No. 2 plain	52.25 to 53.25
Southern No. 1 foundry	51.75 to 54.75
Southern No. 2 foundry and soft	51.25 to 54.25

Structural Material.—Outside of Government orders the market is lifeless, new projects not relating to army or navy needs being insignificant, except for some work for which the Public Service Commission has recently entered the market. This involves 3800 tons for the Culver Rapid Transit Line in Brooklyn and 600 tons for a subway station at Lawrence Street, bids for both of which are to go in early in July. The plans are out for 2300 tons for the new Government projectile plant at Charleston, W. Va., bids on which are to be received July 16. On the same date bids will be taken for 300 tons for a building for the Government at Lake Denmark, Dover, N. J. Bids have been asked on the steel necessary for additions to Bancroft and Isherwood Halls at the Naval Academy at Annapolis, and inquiries have appeared for 400 tons for a building for the Staten Island Shipbuilding Co. The American Bridge Co. has bid on 500 tons for a bridge for the Chesapeake & Ohio and has also taken 800 tons for a smithery building for the League Island Navy Yard, bringing the original building, which called for a structural shop, to a total of 4500 to 5000 tons and making this company's total recent contracts for the Government not far from 30,000 tons. The company has also taken 300 tons for a training school at Newport, R. I. The Chesapeake Iron Works has taken 400 tons for a boiler house for the Consolidated Gas, Electric Light & Power Co. of Baltimore. There has been no decision yet on the 4200 tons required for the 35 or more small buildings for Government storage, bids on which went in on June 25. In railroad work the Pennsylvania Railroad is asking for 550 tons for six bridges and the Philadelphia & Reading 400 tons for one bridge at Hopewell, besides 300 tons for other small bridges. The Pennsylvania Railroad has awarded at least 2000 tons recently to various fabricators for numerous small bridges and similar work. We quote plain material from mill at 4.669c. to 5.169c., New York, the lower price in three to four months and the higher for small lots in earlier deliveries. Shipments from warehouses are 5.25c. per pound, New York.

Iron and Steel Bars.—A leading producer has advanced the price of bar iron to 4.75c., Pittsburgh, for fourth quarter delivery. Some business is still being

taken by other mills at 4.50c., Pittsburgh. Many makers of steel bars are not taking on new business, but are limiting their sales to cover requirements of regular customers. One concern has advanced large size bolts and nuts 30 per cent. We quote steel bars in mill shipments at prices ranging as high as 5.50c., Pittsburgh, or 4.669c. to 5.669c., New York, and bar iron at 4.669c. to 5.169c., New York. From New York district warehouses iron bars are sold at 4.75c. and steel bars at 4.75c. to 5.50c.

Steel Plates.—Makers of plates are still waiting for the Government to make known its requirements. Until this is done they think it a better policy to refuse to accept any more new business from private consumers, especially in view of the fact that it is impossible to promise definite deliveries because of the uncertainty as to what quantities the Government will take. There is not a little impatience because of delays at Washington. Some business in small lots of tank plates is being done, but for the most part the mills are reserving their supplies of Lloyd's specification plates entirely for the Government. Some requisitions have already been received by the mills covering plates for mine sweepers and steel merchant ships, but the total tonnage thus far placed is small in comparison with what must eventually be done if the shipbuilding program is fully carried out. Export demand continues active, but exporters are finding it exceedingly difficult to get supplies, and are often resorting to the purchase of re-sale lots. Such sales of tank plates as have been made, mostly for lots up to 1000 tons, were at 9.50c. to 10c. Universal plates are scarce in this market. Many of the mills are not quoting on boiler plates. No sizeable sales of ship plates have been reported, but 12c. has been noted in a few instances as the price at which holders of stocks were willing to sell. The Grand Trunk has ordered 1000 box cars with the American Car & Foundry Co. On mill shipments of universal and tank plates, when such are accepted, the price is 10.169c., New York, and ship plates, 12.169c., New York. Warehouse stocks are becoming seriously depleted because of the unusual demands upon them. Orders as large as 1000 tons have been picked up by buying from various warehouses. Plates out of store are 9c. to 10c., New York.

Ferroalloys.—The ferromanganese market is easier. The work of the alloy committee of the Council of National Defense has evidently had the effect of assuring consumers of fair supplies and there is less uneasiness than for some time. Inquiries are not in large volume and sales have been very few. Consumers are beginning to come into the market for 1918 and inquiries for this delivery are increasing. Domestic alloy for delivery this year is quoted at $400 to $425, delivered, with about $350 to $375 asked for the first half of 1918. Imports in May were only 2187 tons, according to data furnished THE IRON AGE, the lowest in many months, but it is believed that receipts for June will show a considerable increase. Spiegeleisen, 20 per cent, is not active. Inquiries before the market amount to about 1000 tons and the quotation is around $85, furnace, for delivery this year. Ferrosilicon, 50 per cent, is unchanged at $200 to $225 for material wanted this year, with $130 asked for contracts for 1918 delivery. Ferrotungsten is quoted at $2.20 to $2.50 per lb. of contained tungsten, New York, with the ore concentrates selling at between $20 and $22 per unit. Ferrovanadium ranges from $2.75 to $3, Pittsburgh, per lb. of contained vanadium. Ferro-carbon-titanium is selling at 8c. per lb. in carload lots, 10c. per lb. in ton lots and 12½c. per lb. in lots less than a ton. Ferrochrome, 60 to 70 per cent, is quoted at 16c. to 20c., New York, per lb., of contained chromium.

Cast Iron Pipe.—Recent advances in prices, including the $5 advance last week, have not stopped inquiry from private consumers, but there is practically no business coming from municipalities. No definite information is as yet obtainable as to Government requirements for cantonments in Eastern territory. Carload lots of 6 in. to 8 in. and heavier are now quoted $65.60 per net ton tidewater and 4 in. $68.50.

Old Material.—Owing to the withdrawal from the market of the Carnegie Steel Co. and other large buyers last week, the scrap market sagged very decidedly for two or three days and some heavy melting steel for shipment to the Pittsburgh district was purchased by brokers at as low as $36.50, but later in the week and at the beginning of this week the market was stronger and the prices on steel for shipment to Pittsburgh were on about the same basis as in the early part of last week. For shipment to eastern Pennsylvania the market was considerably stronger, owing to the buying by one or two large consumers, and the prices have been advanced. Brokers quote buying prices as follows to local dealers and producers, gross ton, New York:

Heavy melting steel scrap (for shipment to eastern Pennsylvania)	$38.00 to $39.00
Old steel rails (short lengths) or equivalent heavy steel scrap	39.00 to 40.00
Relaying rails	65.00 to 70.00
Rerolling rails	48.00 to 50.00
Iron and steel car axles	54.00 to 55.00
No. 1 railroad wrought	52.00 to 54.00
Wrought-iron track scrap	48.00 to 50.00
No. 1 yard wrought long	42.00 to 43.00
Light iron	14.00 to 15.00
Cast borings (clean)	22.00 to 23.00
Machine-shop turnings	21.50 to 22.00
Mixed borings and turnings	21.50 to 22.00
Wrought-iron pipe (1 in. min. diameter, not under 2 ft. long)	36.00 to 37.00

The foundry scrap market is strong and transactions are numerous. Dealers in New York City and Brooklyn are quoting as follows to local foundries, per gross ton, New York:

No. 1 machinery cast	$35.00 to $36.00
No. 1 heavy cast (column, building material, etc.)	34.00 to 35.00
No. 2 cast (radiators, cast boilers, etc.)	29.00 to 30.00
Stove plate	22.00 to 23.00
Locomotive grate bars	22.00 to 23.00
Old carwheels	35.00 to 36.00
Malleable cast (railroad)	36.00 to 38.00

To Keep Secret Patented War Inventions

WASHINGTON, July 2.—To prevent publicity detrimental to the public safety by conveying valuable information to the enemy, Senator Weeks of Massachusetts has introduced a bill suspending the granting of patents for inventions useful in carrying on the war. The bill provides that whenever, during the time when the United States is at war, the "publication of an invention by the granting of a patent might, in the opinion of the commissioner of patents, be detrimental to the public safety or defense, or might assist the enemy or endanger the successful prosecution of the war, he may order that the invention be kept secret and withhold the grant of a patent until the termination of the war; provided, that the invention disclosed in the application for said patent may be held abandoned upon its being established before or if said invention has been published or an application for a patent has been filed in a foreign country without the consent or approval of the Commissioner of Patents, or under a license of the Secretary of Commerce as provided by law."

The bill further provides that when an applicant whose patent is withheld shall tender his invention to the Government of the United States for its use, he shall, when he ultimately receives a patent, have the right to sue for compensation in the Court of Claims, such right to compensation to begin from the date of the use of the invention by the Government. The bill has been referred to the Senate committee on patents, which, it is said, is already prepared to report it with a favorable recommendation as the measure is strongly indorsed by Government officials.

The Republic Iron & Steel Co., which will build two more 90 ton open hearth furnaces at its open hearth steel plant, Youngstown, Ohio, will do all the engineering work for these furnaces itself, but expects to place contracts for erecting them, and also for the two 4-hole soaking pits in a short time. J. W. Deetrick, president of Republic company, says its expects to have these two furnaces ready about April 1, next. The company expects delay in the delivery of materials.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St Paul, 32.9c; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c. Denver pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 76.1c., minimum carload, 40,000 lb. Pacific coast (by rail only), pipe 65c.; structural steel and steel bars, 75c., minimum carload, 60,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 4.50c.

Wire Products

Wire nails, $4.00 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails, taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire is $4.05 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.95; galvanized wire, $4.65; galvanized barb wire and fence staples, $4.85; painted barb wire, $4.15; polished fence staples, $4.15; cement-coated nails, $3.90 base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 43 per cent off list for carload lots, 42 per cent off for 1000-rod lots, and 41 per cent off for small lots, f.o.b. Pittsburgh.

Nuts and Bolts

Discounts in effect are as follows, delivered in lots of 300 lb. or more, when the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days:

Carriage bolts, small, rolled thread, 40 per cent, small cut thread, 35 and 2½ per cent; large, 25 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 40 and 10 per cent; small, cut thread, 40 per cent; large, 30 per cent.

Machine bolts, c. p. c. and t. nuts, small, 30 per cent; large, 20 per cent. Bolt ends, h. p. nuts, 30 per cent; with c. p. nuts, 20 per cent. Lag screws (cone or gimlet point), 45 per cent.

Nuts, h. p. sq. blank, $2.10 off list, and tapped, $1.90 off; hex., blank, $1.90 off, and tapped, $1.70 off; nuts, c. p. c. and t. sq., blank, $1.70 off, and tapped, $1.50 off; hex blank, $1.60 off, and tapped, $1.40 off. Semi-finished hex. nuts, 50 and 10 per cent. Finished and case-hardened nuts, 50 and 10 per cent.

Rivets 7/16 in. in diameter and smaller, 40 per cent.

Wire Rods

Soft Bessemer and open-hearth rods to domestic consumers at $95 to $100; high-carbon rods made from ordinary open-hearth steel, $100 to $110, and special steel rods with carbons running from 0.40 to 0.60, $100 to $110 at mill; above 0.60 carbon, $115 to $120.

Railroad Spikes and Track Bolts

We quote railroad spikes 9/16 in. and larger, at $5.00 base; ⅜ in., 7/16 in. and ½ in., $7.50 to $8.00. Boat spikes are about 6.50c. to 7c., all per 100 lb. f.o.b. Pittsburgh, but some makers are quoting above these prices. We quote track bolts with square nuts at 6.50c. to 7c. to railroads, and 8c. to 8.50c. in small lots, for fairly prompt shipment.

Steel Rails

Angle bars at 3.50c. to 3.75c. at mill, when sold in connection with orders for standard section rails, and on carload and smaller lots, 4c. to 4.25c. at mill. Light rails: 25 to rails as follows: 25 to 45 lb., $75 to $80; 16 to 20 lb., $80 to $81; 12 and 14 lb., $82 to $83; 8 and 10 lb., $83 to $84; in carload lots, f.o.b. mill, with usual extras for less than carloads. Standard section rails of Bessemer stock are held at $38, and open-hearth $40, per gross ton, Pittsburgh.

Tin Plate

Long terne plate, No. 28 gage base, $7.25 to $7.50; short terne plate, $12 to $12.50, maker's mill, prices depending on quantity and delivery wanted. The present schedule of prices on terne plate is as follows: 8-lb., 200 sheets, $14 per package; 8-lb., 214 sheets, $14.30 per package; 12-lb., I. C., $15.25 per package; 15-lb., I. C., $15.75 per package; 20-lb., I. C., $16.50; 25-lb, I. C., $17.25; 30-lb., I. C., $18; 35-lb., I. C., $18.75; 40-lb., I. C., $19.50.

Iron and Steel Bars

Steel bars at 4.50c. to 5c. for delivery late this year, and 5c. and higher from warehouse, in small lots for prompt shipment. Refined iron bars, 4.75c.; railroad test bars, 5.25c. in carloads and larger lots f.o.b. mill.

Wrought Pipe

The following discounts in steel are to jobbers for carloads on the Pittsburgh basing card in effect from May 1, 1917, all full weight except for LaBelle Iron Works and Wheeling Steel & Iron Co., which quote higher prices and National Tube, which adheres to card of April 1.

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	42	15½	⅛ and ¼	23	+4
½	46	31½	⅜	24	+3
¾ to 3	49	35½	½	28	10
			¾ to 1½	33	17

Lap Weld

2	42	29½	2	26	12
2½ to 6	45	32½	2½ to 6	28	15
7 to 12	42	28½	7 to 12	25	12
13 and 14	32½	..			
15	30	..			

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	38	20½	¼, ¼ and ⅜	22	5
½	43	30½	½	27	14
¾ to 1½	47	34½	¾ to 1½	33	18
2 to 3	48	35½			

Lap Weld, extra strong, plain ends

2	40	28½	2	27	14
2½ to 4	43	31½	2½ to 4	29	17
4 to 6	42	30½	4½ to 6	28	16
7 to 8	38	24½	7 and 8	20	8
9 to 12	33	19½	9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized, but in some sections of the country discounts on less than carloads are three (3) points less (higher price) than the carload discount on both black and galvanized steel pipe.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are four (4) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are five (5) points lower (higher price).

Boiler Tubes

Nominal discounts on less than carloads, freight added to point of delivery, effective from Nov. 1, 1916, on standard charcoal iron tubes, and from April 2, 1917, on lap-welded steel tubes are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	31	1½ in.	23
2¼ in.	28	1¾ and 2 in.	35
2½ and 2¾ in.	34	2¼ in.	32
3 and 3¼ in.	34	2½ and 2¾ in.	38
3½ to 4½ in.	34	3 and 3¼ in.	43
5 and 6 in.	33	3½ to 4½ in.	No quotations
7 to 13 in.	30	5 and 6 in.	37
		7 to 13 in.	34

Above discounts apply to standard gages and to even gages not more than four gages heavier than standard in standard lengths.

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

[Open-hearth stock, $5 per ton above these prices.]

Blue Annealed—Bessemer

	Cents per lb.
Nos. 3 to 8	8.00 to 8.50
Nos. 9 and 10	8.25 to 8.50
Nos. 11 and 12	8.50 to 8.75
Nos. 13 and 14	8.75 to 9.00
Nos. 15 and 16	9.00 to 9.25

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 to 21	8.30 to 8.50
Nos. 22 and 24	8.35 to 8.85
Nos. 25 and 26	8.40 to 8.90
No. 27	8.45 to 8.95
No. 28	8.50 to 9.00
No. 29	8.55 to 9.05
No. 30	8.65 to 9.15

Galvanized Black Sheet Gage—Bessemer

Nos. 10 and 11	9.00 to 9.50
Nos. 12 and 14	9.10 to 9.60
Nos. 15 and 16	9.25 to 9.75
Nos. 17 to 21	9.40 to 9.90
Nos. 22 and 24	9.55 to 10.05
Nos. 25 and 26	9.70 to 10.20
No. 27	9.85 to 10.35
No. 28	10.00 to 10.50
No. 29	10.25 to 10.75
No. 30	10.50 to 11.00

Tin-Mill Black Plate—Bessemer

Nos. 15 and 16	7.80 to 8.30
Nos. 17 to 21	7.85 to 8.35
Nos. 22 to 24	7.90 to 8.40
Nos. 25 to 27	7.95 to 8.45
No. 28	8.00 to 8.50
No. 29	8.05 to 8.55
No. 30	8.05 to 8.55
Nos. 30½ and 31	8.10 to 8.60

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
June	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
27	32.25	32.25	62.00	11.37½	11.25	9.37½	9.12½
28	32.25	32.25	62.00	11.37½	11.25	9.37½	9.12½
29	32.00	32.00	62.00	11.37½	11.25	9.25	9.00
30	32.00	32.00	62.00	11.37½	11.25	9.25	9.00
July							
2	31.75	31.75	62.00	11.37½	11.25	9.25	9.00

NEW YORK, July 3.

Stagnation characterizes most of the metals and price tendencies are lower. Copper is in poor demand and nominal. Tin is unchanged, and shows little activity. Lead is lower and demand only fair. Spelter is decidedly weaker. Antimony continues unchanged and dull.

New York

Copper.—The tone is easier and the tendency of the copper market is downward, with the quotation yesterday for Lake and electrolytic nominally at 31.75c., New York. If possible, the market has been quieter this week than last, with business confined to small lots and the market a drifting one. Considerable secrecy surrounds negotiations at Washington regarding Government purchases. The statement, recently published, that the Government has bought 60,000,000 lb. for early delivery at 25c. per lb. is believed by some in the trade, and is not accepted by others. If the deal has really gone through, it is thought that it covers requirements for not more than two months. More attention is being paid to the reports of serious strikes among the miners in the West, but in some quarters these are believed to be exaggerated for political effect. Quotations for third quarter are generally regarded at 30c., New York, with fourth quarter at 29c., and July metal obtainable at 31.75c. to 32c. The London market for electrolytic is unchanged at £142 for spot delivery.

Copper Averages.—The average price of either Lake or electrolytic copper for the month of June, based on daily quotations in THE IRON AGE, was 32.46c.

Tin.—Cautiousness pervades the entire market and general business is slow. The repeated absence of cables from London at the usual time, and the fact that they are often delayed until the next day, holds business in check, and is felt by all buyers and sellers. As a result, sellers are in doubt as to what to quote, and buyers as to what course to pursue. Very little business was done late last week. Spot metal, about 50 tons, was sold June 27 at about 62c., New York, but on June 28 and 29 no sales were reported, although inquiries probably aggregated 100 tons. On July 2 about 100 tons of September-October shipment from the East was sold at 56.25c., New York, and there was considerable inquiry for June shipment from the East, but there was practically none to be had because of its scarcity. The spot market was practically at a standstill. Deliveries of metal for June, according to the New York Metal Exchange, were 6398 tons, of which 2798 represent arrivals at the Pacific coast. Arrivals on July 2 were 280 tons, with the quantity afloat 3081 tons. Spot Straits tin on July 2 in London was quoted at £244.

Lead.—The lead market is entirely bare of features and prices have eased off to 11.25c., St. Louis, which was forecasted last week. Some business was done last week but the volume was not large, a few sales being made as low as 11c., St. Louis. At the close inquiry was better and a fair business was reported done at 11.25c., St. Louis. More metal is being offered than there seems to be a demand for and it is not improbable that the market may go lower. Business in general is unsatisfactory and the recent purchase by the Government for no more than its July requirements has weakened rather than strengthened the market.

Spelter.—The market is decidedly weak and quotations are off about ⅛c. from those of last week. Early delivery of prime Western is obtainable at 9c., St. Louis, or 9.25c., New York, with August and September metal quoted at 9.12½c., St. Louis, or 9.37½c., New York. Transactions are extremely light. Reports that the Government has purchased 11,000 tons of high grade spelter at 13.50c. per pound, or 2c. higher than the 6700 tons purchased early in May, are not confirmed. The continued uncertainty regarding this whole important matter is a great drawback. At present prices, there are many producers unable to make a profit and if these conditions continue much longer numerous smelters will have to close down. Spelter exports in May were 18,553 tons.

Antimony.—No change is reported. Chinese and Japanese grades are quoted at 19c. to 19.50c., New York, duty paid, with demand very slack. About 25 tons of Cookson's antimony on the way here from England has been sunk. This was quoted at 22c., New York, ex-steamer, and is the first to be released to this country in some time.

Aluminum.—Prompt and early delivery of No. 1 virgin metal, 98 to 99 per cent pure, is quoted at 58c. to 60c., New York, but demand is very light.

Old Metals.—The market is quiet. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	30.50 to 31.00
Copper, heavy and wire	29.00 to 29.50
Copper, light and bottoms	27.50 to 28.00
Brass, heavy	20.00 to 20.25
Brass, light	15.00 to 15.75
Heavy machine composition	27.00 to 27.25
No. 1 yellow rod brass turnings	19.25
No. 1 red brass or composition turnings	21.50 to 22.50
Lead, heavy	10.50 to 10.75
Lead, tea	9.75
Zinc	7.75

Chicago

JULY 2.—The entire market is quiet with the only business of a routine sort. Quotations generally are a little lower. We quote as follows: Casting copper, 30c.; Lake, 31c.; electrolytic, 32c.; tin, carloads, 62.50c.; small lots, 65c. to 66c.; lead, 11.25c. to 11.50c.; spelter, 9c.; sheet zinc, 19c.; Oriental antimony, 22c. to 24c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 26.50c.; copper clips, 26c.; copper bottoms, 24c.; red brass, 23.50c.; yellow brass, 17c.; lead pipe, 9c.; zinc, 6.50c.; pewter, No. 1, 35c.; tin foil, 40c.; block tin, 45c.

St. Louis

JULY 2.—Non-ferrous metals continue to be held firmly, though there has been little feature other than that to the market. In car load lots, the quotations to-day were: Spelter, 9.25c. to 9.50c.; lead, 11.25c. to 11.50c. In less than car load lots, the quotations have been: Lead, 13c.; spelter, 11.50c.; tin, 68.50c.; Lake copper, 33.50c.; electrolytic copper, 33c.; Asiatic antimony, 25c. In the Joplin district, the price of lead ore has held pegged at $130 per ton basis of 80 per cent metal, with the average for the district at $130 because of the premium ores which covered the off grade ores. The production of lead is increasing with the opening of new bodies, but the demand seems to keep up with the supply. It is also true that many of the producers are holding considerable quantities of ore for higher prices. In zinc blende, the price for the week, basis of 60 per cent metal, ranged from $70 to $80 per ton with the average for the week for the district at $76 per ton. Calamine ranged from $38 to $45 per ton basis of 40 per cent metal with the average at $43 for the district. On miscellaneous scrap metals, we quote as follows: Light brass, 12c.; heavy yellow brass, 15c; heavy red brass and light copper, 20c.; heavy copper and copper wire, 23.50c.; pewter, 25c.; tinfoil, 40c.; lead, 6.50c.; zinc, 6c.; tea lead, 4c.

The establishment of a central bureau for master gages and of district headquarters for copies of those gages is being investigated by a committee of the American Society of Mechanical Engineers, with President Ira N. Hollis chairman of the committee.

IRON AND INDUSTRIAL STOCKS

Easier Money Conditions—Rate Decision Causes Some Anxiety in Wall Street

Two features stood out prominently in the stock market last week. The first was the easing of somewhat strained conditions caused by the high rate of interest prevailing the previous week and the second was the anxiety caused at the close of the week by the decision of the Interstate Commerce Commission in the railroad rate case.

The establishing of easier conditions in the money market was greatly helped by the Federal Reserve banks and is regarded as a notable achievement of the new banking system. The old world has been watching developments in this country very closely and the London correspondent of the *Evening Post* cabled his paper Saturday as follows:

LONDON, June 30.—Lombard Street now believes, in the light of events on your money market, that the adaptation of your financial machinery to the transactions growing out of the war loan, and to the consequent phenomenal shifting of cash balances, will turn out to be as strikingly successful as was the loan itself. To us, the indications are plain that your Federal Reserve officials are taking the large view and obtaining a thorough grasp of the financial situation. This skillful administration of the system has manifestly been primarily responsible for the easy money conditions with which your market ends the week.

These results could not have been foreseen with absolute assurance here, and we knew that demands on the credit system, incidental to your Liberty Loan and the fiscal year-end, must be colossal during the past few days. This was what kept our own bankers from reducing deposit rates last week.

The immediate effect of the Interstate Commerce Commission's freight rate decision was a decline Saturday of from one to five points in the leading railroad shares, but before the close of the exchange some of the stocks had recovered and a better feeling prevailed. Industrial stocks displayed considerable strength Saturday, some steel stocks especially being in active demand.

Among the industrial stocks that registered gains during the week were the following:

Allis-Chalmers, 1 point; American Car & Foundry, 1¼; Baldwin Locomotive, ⅝; Crucible Steel, 5¾; International Harvester, 5; Lackawanna Steel, ¼; United States Steel, ⅛. Among the stocks that made losses during the week were the following: American Can, ½; American Locomotive, 2⅜; Bethlehem Steel, ½; Bethlehem Steel Class B, 1½; Colorado Fuel & Iron, ¼; Gulf State Steel, 1; Midvale Steel, ½; National Enameling & Stamping, ⅝; Pressed Steel Car, 2⅛; United States Steel Preferred, ¼. American Steel Foundries and Republic Iron & Steel stood at the end of the week the same as at the beginning, the former at 72½ and the latter at 92½.

The range of prices in active iron and steel stocks on Wednesday of last week and Monday of this week was as follows:

Allis-Chal., com..	29 - 30½	Lacka. Steel	94¾ - 98
Allis-Chal., pref..	82¾ - 86	Lake Sup. Corp..	19⅛ - 20
Am. Can, com...	47½ - 50	Midvale Steel ...	61⅛ - 64⅝
Am. Can, pref...	104⅞-105	Nat.-Acme	34¼ - 35½
Am. Car & Fdry., com.	76 - 79⅞	Nat. En. & Stm., com.	38¼ - 40
Am. Loco., com..	69½ - 76½	Nat. En. & Stm., pref.	98
Am. Rad., pref.....	275	N. Y. Air Brake.....	145
Am. Ship, com...	86 - 90	Nova Scotia Stl..	99 -100¼
Am. Ship, pref.....	94⅝	Pitts. Steel, pref.....	100
Am. Steel Fdries.	70 - 73⅜	Pressed Stl., com.	74½ - 76½
Bald. Loco., com.....	70	Pressed Stl., pref.	100 -101½
Beth. Steel, com.....	145½	Ry. Steel Spring, com.	52¾ - 56¾
Beth. Steel, Class B	137½-143¾	Republic, com...	90⅛ - 93½
Carbon Stl., com.	102 -105	Republic, pref...	102⅝-103½
Central Fdry., com.	36 - 38	Sloss, com.	57½ - 59
Central Fdry., pref.	54½ - 56⅛	Superior Steel...	49 - 51¾
Colo. Fuel	51½ - 54½	Sup. Steel, 1st pref....	101
Cruc. Steel, com..	85¾ - 91¼	Transue-Williams	46 - 46½
Cruc. Steel, pref..	102¾-103	Un. Alloy Steel..	45 - 45⅜
Deere & Co., pref.	99⅛ - 99½	U. S. Pipe, com..	22⅝ - 23¼
Gen. Electric ...	162 -162½	U. S. Pipe, pref.....	57½
Gt. No. Ore Cert.	31⅝ - 33	U. S. Steel, com..	128 -132⅝
Gulf States Steel.	127 -128½	U. S. Steel, pref..	117¼-118
Gulf. S. Steel, 1st pref.	109½	Va. I. Co. & Coke	70 - 72¼
		Westing. Elec....	49⅞ - 52⅛

Pays Dividend in Liberty Bonds

The American Brake Shoe & Foundry Co., New York, has declared a dividend of 5 per cent in Liberty bonds, the first distribution so far made of the new 3½'s by an industrial corporation. Besides the bond dividend the company paid an extra cash dividend of 1 per cent and also another 1 per cent with the request that this extra payment be turned over to the Red Cross. In addition to these dividends the usual quarterly 2 per cent on preferred and 1¾ per cent on common were paid. William G. Pearce, president, said in a letter accompanying the dividends that the munitions contracts had been completed and the profits were represented by the new Erie plant, which cost $2,000,000, and a reasonable amount of cash. The employment of the profit from munitions work, he said, together with the regular earnings of the company, made it probable that the preferred stock dividend would hereafter be 3 per cent instead of 2 per cent quarterly unless heavy war taxes prevented.

Continental Can Co. Adds to Capital

The directors of the Continental Can Co. have decided at a special meeting to issue 20,000 shares of new common stock, to which stockholders will be permitted to subscribe to the extent of 25 per cent of their present holdings. The new issue is to provide additional working capital. The company now has $8,000,000 of common stock outstanding and the new issue will bring the total up to $10,000,000. There is $5,000,000 of 7 per cent cumulative preferred also outstanding.

Will Retire Bonds

On July 1, the Sharon Steel Hoop Co., Sharon, Pa., will retire $750,000 of bonds of the Youngstown Iron & Steel Co., which it took over some months ago. Reports that the Sharon Steel Hoop Co. would erect a blast furnace at Sharon are officially denied. The company has under consideration plans for material extensions and improvements to the plants of the Youngstown Iron & Steel Co. at Haselton, Ohio, but what these will be has not yet been determined, and may not be for some time.

Industrial Finances

The Erie Iron & Steel Co., Erie, Pa., has increased its capital stock from $100,000 to $500,000.

The Washburn Wire Company has called for redemption on June 30, at $130 per share, all its preferred stock, amounting to 25,000 shares.

In addition to the regular 2 per cent monthly dividend, the Kokomo Steel & Wire Co., Kokomo, Ind., has declared a 5 per cent cash dividend, payable July 1. At the annual meeting the officers and directors were all re-elected. Officers: A. A. Charles, president; A. V. Conrath, vice-president; J. E. Frederick, general manager and secretary; G. W. Charles, treasurer, and S. S. Shambaugh, assistant treasurer. The year just closed was by far the best in the company's history, business done amounting to over $6,000,000.

Directors of Trumbull Steel Co., Youngstown, recommend a capital increase from $10,000,000 to $12,000,000 with an offering of new stock. Proceeds will be used for increasing output of open-hearth and plate departments and purchase of coal lands now under option.

A new holding company is to be organized by the Breitung ore interests and will be known as the Breitung Co. It will have $15,000,000 common stock and $3,000,000 preferred. Edward N. Breitung is president of the new company, Norman Herriman is vice-president and William A. Hamilton secretary. The companies taken over are Mary Charlotte Mining Co., Breitung Hematite Mining Co., Juliet Iron Co., Lucky Star Mining Co., Washington Iron Co., and the Clifford Extension Iron Co., all of Michigan; Hopkins Mining Co. of Minnesota and the Breitung Iron Co., a Michigan corporation, owning the Loon Lake Mining Co., at Wilde, Ont.

The Detroit Iron & Steel Co., Detroit, has voted to increase its common stock from $750,000 to $1,500,000 by issuing a 100 per cent stock dividend from accumulated earnings. A 10 per cent cash dividend on common stock and a 1¾ per cent dividend on preferred were also declared. The 10 per cent cash dividend on common stock will be paid quarterly, beginning July 16. The capital stock of the company is now $2,500,000.

The Gulf States Steel Co. has called a special meeting of holders of stock trust certificates for Aug. 21 to take action on a plan to retire $2,000,000 first preferred stock outstanding at $110 a share and accrued dividends.

Brier Hill Elections

Annual meetings of subsidiary interests of the Brier Hill Steel Co. were held at Youngstown, Ohio, last week, and resulted in election of officers as follows: Brier Hill Coke Co.: Thomas McCaffrey, president, W. H. Warren, vice-president, W. B. Phelan, secretary, N. B. Folsom, treasurer, and Thomas McCaffrey, W. H. Warren, J. G. Butler, Jr., John N. Allen, G. F. Alderdice and W. B. Phelan, directors. Brier Hill Supply Co.: John N. Allen, president, Thomas McCaffrey, vice-president, W. B. Phelan, secretary, N. B. Folsom, treasurer, and Thomas McCaffrey, W. B. Phelan and John N. Allen, directors. The Brier Hill Coke Co. operates about 450 beehive coke ovens at Brier Hill, Pa., which formerly supplied coke for the Grace and Tod blast furnaces of the Brier Hill Steel Co. at Youngstown. However, the Brier Hill Steel Co. now has a plant of 84 Koppers by-product coke ovens, which furnish plenty of coke for its two furnaces, and the output of the 450 beehive ovens at Brier Hill is nearly all sold in the open market.

Dividends

The American Laundry Machinery Co., quarterly, 1¾ per cent on the preferred, payable July 16.

The American Screw Co., quarterly, 1¾ per cent and extra 3 per cent, payable June 30.

The American Shipbuilding Co., quarterly, 1½ per cent and extra 3 per cent on the common, and 1¼ per cent on the preferred, all payable July 20.

The E. W. Bliss Co., quarterly, 1¼ per cent, and extra 11¼ per cent on the common, payable July 2.

The Canadian Crocker-Wheeler Co., quarterly, 1¾ per cent on the common and preferred stocks, payable June 30.

The Canadian Westinghouse Ltd., quarterly, 1¾ per cent, payable July 2.

The Carbon Steel Co., quarterly, 1½ per cent and extra 2½ per cent on the common, payable Aug. 15, also extra 1½ and 2½ per cent on the common, payable Nov. 15, and 6 per cent annual on the second preferred, payable July 30.

The Central Foundry Co., 1¼ per cent on the preferred, payable July 16.

The Charcoal Iron Co. of America, quarterly 15c. per share on the common and 30c. per share on the preferred, payable July 5.

The Chicago Pneumatic Tool Co., quarterly, 1 per cent, payable July 25.

The Eastman Kodak Co., quarterly, 2½ per cent on the common, and 1½ per cent on the preferred, payable Oct. 1, and extra 5 per cent on the common, payable Sept. 1.

The Lukens Steel Co., quarterly, 1¾ per cent on the first and second preferred, payable July 15.

The Poole Engineering & Machine Co., quarterly, 1½ per cent, payable July 12.

The Scovill Mfg. Co., quarterly, 2 per cent and extra 10 per cent, payable July 2.

The Sharon Steel Hoop Co., quarterly, 2 per cent, payable July 10.

The Standard Coupler Co., 4 per cent on the preferred, payable June 30.

The Transue & Williams Steel Forging, quarterly, $1.25 per share, payable July 16.

The Westinghouse Air Brake Co., quarterly, $1.75 per share, payable July 21.

No building or construction work costing over $2,500, or involving the use of structural steel, can be undertaken without a license from the Ministry of Munitions of Great Britain, and such license is as necessary for work involved in the restoration of property destroyed or damaged by fire or aircraft as for work undertaken in other circumstances.

To operate the blast furnace which it recently purchased at Goshen, Va., the Miami Metals Co. has organized the Southeastern Iron Co. The subsidiary operations will be directed by H. A. Brassert.

STEEL COST INVESTIGATION

Senate Committee Waiting and Trade Commission Inquiry Will Be Protracted

WASHINGTON, July 2.—The investigations of the steel trade with a view to determining a basis for reasonable prices to the Government, which were launched last week, are making slow progress. The Senate Committee on Interstate Commerce and the Federal Trade Commission, which are preparing to conduct the inquiries, are heavily burdened with other matters and important developments are not to be looked for in the very near future. The Senate Committee on June 26 began formal hearings, pursuant to the agreement reported in this correspondence last week, but has devoted all of its public sessions to hearing representatives of the coal industry. This branch of the inquiry having been practically concluded, the committee has adjourned subject to the call of the chair to permit plans to be made for taking up other branches of the investigation, including iron and steel. Certain members of the committee are of the opinion that, in view of the investigation now on foot by the Federal Trade Commission, further steps in this direction by the Senate Committee would be a mere duplication of work and might delay rather than expedite a final determination of the issues involved. Chairman Newlands, however, is authority for the statement that the committee has not yet decided to abandon the steel inquiry.

The Federal Trade Commission held several executive sessions during the week to plan the investigation directed by the President, Mr. Wilson himself meeting with the members of the commission on one occasion and taking an active part in the discussion. The commission now has a force of approximately 200 more or less experienced investigators either in Washington or scattered over the country engaged in various lines of work, and it is proposed to select from these 40 or 50 of the most competent and to set them at work without delay. The object of the inquiry will be, first, to secure as early as possible a preliminary report on the cost of making steel and the other products covered by the investigation, and to follow later on with a more elaborate and comprehensive study of methods of manufacture, selling practices, profits, and other factors entering into the broad problem as to what constitutes a reasonable scale of prices for Government requirements. Obviously this inquiry will consume much time and it is the best opinion here that the most important purchases to be made by the Government of steel and other materials now under investigation will be made on the basis of tentative prices to be increased or reduced in accordance with a final schedule to be based in whole or in part upon the ultimate findings of the commission.

New Design of Crucible

Sometime ago, the Lava Crucible Co. was organized in Pittsburgh to develop and manufacture a new design of lava crucible for melting brass, steel and other materials. The crucible is the invention of Louis DeBats, and the company has leased a plant at Zelienople, Pa., on the main line of the Baltimore & Ohio Railroad. Kilns, dry rooms, etc., are being installed for a capacity of 100 crucibles per day and the company expects to be making crucibles not later than Aug. 15. It is stated that the crucibles are made entirely of domestic graphite, carbide of silica, clay and other binding materials. The Lava Crucible Co., has offices in the First National Bank Building, Pittsburgh. M. E. Moffett is president; M. W. Ray is vice-president and P. L. Berley is secretary and treasurer.

PERSONAL

The first unit of what may be termed the Industrial Aid has arrived at a port in Europe in the person of H. D. Tremper, of the Federal Export Corporation, 115 Broadway, New York. Mr. Tremper will act as advisor of the European branches of his company, but a more important feature of his mission is the service he will render to the industrial and commercial interests of this country's allies, in preparing for the competition with the central powers which is expected after the war. On June 21 a dinner was given Mr. Tremper at Sherry's by S. C. Munoz, president of the Federal Export Corporation. A jeweled pin of entwined French and American flags was presented to Mr. Tremper by Mr. Munoz, with the comment: "This remembrance typifies the spirit of the men gathered here in their desire to extend help to those men overseas who have dedicated their plants to the service of their country without regard of what the future may bring them after the return of peace." Mr. Munoz further remarked on the wrong conception of our commercial position in this war, and emphasized the point that the United States needs its allies in a prosperous condition, if only for a selfish reason. He added: "This mission of Mr. Tremper's should not be confused with a business trip. He goes out as our envoy to find where and how the United States can help those who have nobly given up their livelihood in defense of their principles—and ours. We are building for the future and it depends on how the business interests of this country handle our control of the world's necessities, whether the United States becomes known as the kind and friendly nation, or is despised for its power and its money grasp on the world."

H. D. TREMPER

Otto H. Kaufman has been appointed sales manager of the Challoner Co. and Giant Grip Horseshoe Co., Oshkosh, Wis.

Jay C. McLauchlan, for many years district sales manager at Detroit of the Lackawanna Steel Co., Buffalo, has resigned and is now associated with Pickands, Mather & Co., Cleveland. He has been succeeded at Detroit by H. E. Blackwell.

D. B. Mugan, formerly associated with the Illinois Central Railroad Co., in charge of the electrical department at New Orleans, has been appointed resident manager of the Edison Storage Battery Supply Co., with headquarters at 201 Baronne Street, New Orleans.

H. C. Ryding, who has been assistant to the vice-president of the Tennessee Coal, Iron & Railroad Co., has been appointed to succeed Frank H. Crockard as vice-president. The office of assistant to the vice-president has been discontinued. Mr. Ryding became connected with the Tennessee company in 1907, resigning the position of steel works and rolling mill superintendent at the Lorain, Ohio, plant of the National Tube Co. He was associated with the late Max M. Suppes in the building of the girder rail mill of the Johnson Co. at Johnstown, Pa., and later in the construction and operation of the works of its successor, the Lorain Steel Co., at Lorain. His experience has been extensive in both the metallurgical and rolling mill departments of steel manufacture. He is a native of Great Britain and his technical training included courses in that country and Germany.

H. C. RYDING

Charles J. Barr, who resigned last year as general superintendent of the Ensley Works of the Tennessee Coal, Iron & Railroad Co. to become general manager of the Algoma Steel Co., Sault Ste. Marie, Ontario, will return to the service of the Tennessee company. It is expected that Mr. Barr will have charge of the extensive construction program which was recently announced the Steel Corporation would carry out at Fairfield, Ala.

Oden H. Wharton became president of the Crucible Steel Co. of America, Pittsburgh, on July 1. Mr. Wharton was born and raised in Easton, Pa., and received his schooling at that place. His first business connection was as office boy for Park Brothers & Co., Ltd., at that time operating the Black Diamond Steel Works in Pittsburgh, soon becoming bill clerk and then traveling for some years for the company. Later he was connected with the sales departments of the Park Steel Co. in Cleveland and other cities. He went to Boston for some years as representative of the Park Steel Co., and later of the Crucible Steel Co. of America, and was finally appointed general manager of sales of that company, with headquarters at Pittsburgh. After holding this position for several years, his health failed, and he was succeeded by Reuben Michener, the present general manager of sales. Mr. Wharton traveled in Europe for a year or more, and regaining his health, was appointed assistant to President Charles C. Ramsey of the Crucible Steel Co. On the death of President Ramsey, last January, Herbert DuPuy, chairman of the board of the company, assumed temporarily the presidency of the company. The new president is a member of the Duquesne and Pittsburgh Clubs, the Allegheny Country Club and the Pittsburgh Athletic Association.

ODEN H. WHARTON

W. P. Steele has been appointed Western representative of the American Locomotive Co., with headquarters in the McCormick Building, Chicago.

George McDeems has been made superintendent and manager of the Elmwood Castings Co., Cincinnati.

Walter A. Zelnicker Supply Co., St. Louis, announces the recent appointment of Karl W. Bock as manager. Mr. Beck had been for 10 years secretary of and assistant to the vice-president of the Union Pacific Coal Co. and subsidiary coal companies, located at Omaha, Neb. The St. Louis company also announces

that it has secured the services of W. H. Dayton as city salesman. Mr. Dayton was formerly with the Railroad Supply Co., Chicago, as secretary and purchasing agent; also its Eastern representative for five years. He went to St. Louis seven years ago, representing the Railway Supply Co., the Chicago Signal & Supply Co. and the Elyria Iron & Steel Co.

W. W. Butler, vice-president of the Canadian Car & Foundry Co., Montreal, has announced the appointment of R. H. Parks as operating manager of the company. Mr. Parks will have operating charge of all the car plants of the company. He has been identified with the car building industry for many years and went to Canada from the Bettendorf Car Co. of Davenport, Iowa. Coincident with this appointment, W. S. Atwood has been appointed assistant to the vice-president and managing director. Mr. Parks, accompanied by Mr. Atwood, has left for Fort William, Ont., to make arrangements in connection with the equipment of the Fort William plant of the company, at which a large part of the new contract recently secured by the company from the Dominion Government will be carried out.

William Guy Wall, vice-president and chief engineer of the National Motor Vehicle Co., Indianapolis, has been given a commission of major by Secretary of War Baker and will have charge of the design and production of armored motor cars and tanks. He has been chief engineer of the National company for 15 years and has had a wide experience with high speed motors.

H. L. Paulus, R. G. Ferguson and F. L. Graf, for a number of years connected with the Baird Machinery Co., Pittsburgh, have severed their connection with that company and have joined the staff of the J. S. Miller Machinery Co., Pittsburgh.

J. E. Thropp, Jr., for some time superintendent of the Sheridan, Pa., blast furnace of the Berkshire Iron Works (owned by E. J. Lavino & Co., Philadelphia) and superintendent of the Marietta, Pa., blast furnace of the same interests, has resigned.

Paul D. Hanks, president Kerr Turbine Co., Wellsville, N. Y., announces the appointment of G. M. Campbell, formerly of the Lynn, Mass., plant of General Electric Co., as works manager and production expert.

Samuel L. Nicholson, who has been sales manager of the Westinghouse Electric & Mfg. Co. since 1909, has been promoted to the position of assistant to vice-president, with headquarters at East Pittsburgh. In 1898, Mr. Nicholson became sales representative of the Westinghouse Electric & Mfg. Co., in New York, subsequently having charge of the city and industrial division of the New York office. On the reorganization of the sales department in 1904, he was made manager of the industrial department, which position he filled until his selection as sales manager of the company in 1909.

Walter V. Turner, chief engineer of the Westinghouse Air Brake Co., Wilmerding, Pa., delivered an address last week on "The Making of War Munitions," before the Alexander Hamilton Institute in Pittsburgh.

Frederick Cunliffe has been appointed traffic manager of the Allegheny Forging Co., Pittsburgh, works at McDonald, Pa.

Lawrence B. Robertson, superintendent of the coke department of the Maryland Steel division of the Bethlehem Steel Co., is vice-chairman of the Baltimore section committee of the American Society of Mechanical Engineers.

Lucius M. Wainwright, president Diamond Chain & Mfg. Co., Indianapolis, is vice-chairman of the local committee of the American Society of Mechanical Engineers.

George V. Ahara, Canadian Fairbanks-Morse Co., Ltd., is chairman of the Toronto local committee of the American Society of Mechanical Engineers.

Charles T. Main, consulting engineer, Boston, has been nominated for president of the American Society of Mechanical Engineers for the year beginning next December. For vice-presidents the nominations are: Spencer Miller, Lidgerwood Mfg. Co., New York; Max Toltz, president Toltz Engineering Co., St. Paul, Minn., and John Hunter, chief engineer Union Electric Light & Power Co., St. Louis. For managers the nominations are: Fred A. Geier, president Cincinnati Milling Machine Co., Cincinnati; D. R. Yarnall, Yarnall-Waring Co. and Nelson Valve Co., Philadelphia, and Fred N. Bushnell, vice-president Stone & Webster Engineering Corporation, Boston.

H. D. Shute, whose election as vice-president of the Westinghouse Electric & Mfg. Co., as recently announced, will have executive charge of the company's commercial organization, both domestic and export, succeeding Vice-President L. A. Osborne, whose headquarters have been transferred to New York.

T. G. Whaling, who has been assistant general manager and sales manager of the Westinghouse Lamp Co., has been appointed general manager to succeed Walter Cary, recently elected a vice-president of the Westinghouse Electric & Mfg. Co. Mr. Cary, who for the past six years has been vice-president, and for 14 years general manager of the Westinghouse Lamp Co., will still devote a large part of his time to the incandescent lamp business, together with his duties in connection with the Westinghouse Electric & Mfg. Co.

Robert S. Stewart, vice-president of the United States Motor Truck Co., Cincinnati, has been appointed executive officer in charge, and Forrest J. Alvin is to be general manager and director of sales of the company. The company is at present doubling its production, which is already the largest in its history.

Harry L. Shepler has resigned as vice-president of the Willys-Overland Co., Toledo, effective July 1. William H. Birchall, superintendent, has been made general superintendent of the Toledo factory, assuming the work formerly in the charge of Mr. Shepler.

James H. Heaslet has resigned as vice-president in charge of production of the Studebaker corporation, South Bend, Ind., and has become consulting engineer of the company.

OBITUARY

JOHN BENNETT, vice-president, Coates, Bennett & Reidenbach, Inc., Rochester, N. Y., died suddenly in that city June 23. He was well known in the iron, steel and metal trades, having entered the business over 20 years ago, and passing through its various stages, beginning as an employee in the office and rising to the position of vice-president and manager of the iron and steel department. He was born in England April 2, 1869, and came to this country in 1890.

COLONEL FRANK L. BIGELOW, president and treasurer of the Bigelow Co., New Haven, Conn., boiler maker, died suddenly, June 20, while playing golf. Mr. Bigelow was born in New Haven, Sept. 21, 1862, the son of ex-Governor Hobart B. Bigelow. He was graduated from Sheffield Scientific School, Yale University, in 1881, and immediately entered the Bigelow Co., which was founded by his father. He was also president of the National Pipe Bending Co.

ABRAHAM L. KEISTER, president of the Lincoln Coal & Coke Co., died at his home in Scottdale, Pa., May 26, 1917, aged 64 years. He was president of the First National Bank of Scottdale from the time of its organization to his death, and served as a member of the House of Representatives from the 22d Pennsylvania District in the sixty-third and sixty-fourth Congresses.

GEORGE M. ROBINSON, who retired this year as president of the Charter Gas Engine Co., Sterling, Ill., after 50 years of service with that company, died June 22. He was a pioneer in the movement to place a gas engine on the market, the Charter engine being the first to use gasoline as a fuel.

Book Reviews

The Effect of Wars and Revolutions on Government Securities. By E. Kerr. Pages 131, 5¼ x 8 in.; illustrated by charts and tables. Published by William Morris Imbrie & Co., bankers, New York and Chicago.

The extent to which the United States Government can go in financing the present war, without undue risk, is interestingly discussed in this book. It is argued that on the basis of the relation between national indebtedness and wealth at the time of the Civil War, when an obligation was incurred equal approximately to one-ninth of the country's wealth, "the present Government should be able to float a loan of $25,000,000,000, with every prospect of its forming a safe, sound and thoroughly desirable investment for the individual." On the basis on which Great Britain and France are borrowing, the author holds that this country could borrow with comparative safety up to $38,500,000,000. "The United States has proved," he says, "that it can easily and rapidly pay off a considerable debt, and it is still a country with magnificent opportunities for development and the production of new wealth."

"The period following the Napoleonic War saw an enormous change in the economic, industrial and governmental conditions and methods of the world, while from about that time date most of the debts of the modern nations. The world's development has been practically steady and continuous since then." The author argues that while no one can foretell what will happen after such a great war as this, if precedent can be taken to mean anything at all the expansion and stimulation in industries and invention which will follow this war will be greater than have ever been known in the world's history.

Poor's Manual of Public Utilities. Text pages, 2400 + 31 pages of high and low prices, 5¾ x 8¾ in. Published by Poor's Railroad Manual Co., New York. Price, $10.

Complete financial statements of practically every public utility company in the United States and Canada in which there is public interest are presented in the 1917 edition of this well-known work. A new feature is the "margin of safety" over interest or dividend requirements of individual stocks and bonds. This margin is a practical rating of securities based on the facts and answers the question, "What is the risk involved?" The new manual gives general information revised to May 15, 1917; income accounts and balance sheets as of Dec. 31, 1916, and some as late as April 30, 1917.

"Structure of the Coating on Tinned Sheet Copper in Relation to a Specific Case of Corrosion" is the title of Technological Paper No. 90, issued by the U. S. Bureau of Standards by Paul D. Merica, associate physicist. The attention of the author has been directed to a curious case of local corrosion or pitting in tinned sheet copper roofing. The pits occur in general along the line of surface scratches, having appeared some eight or ten years after completion of the roof. These pits are apparently unrelated to the service conditions, and to the direction of rolling of the sheet. When the copper becomes exposed, as in the present case at the bottom of the scratches on the surface, it forms together with the alloy layer a galvanic couple, electrolytic action sets in and the copper at these points is corroded, forming the pits described. This publication gives the results of a study on the structure of tin coatings on copper and it is shown that this coating consists of at least three layers, viz.: a thin layer of Cu_3Sn immediately next to the copper, then a layer of Heycock and Neville's constituent H, containing about 60 per cent by weight of tin, and finally a layer of the eutectic of tin and copper, in which is found most probably also the lead when it is present in the tinning mixture. These alloy layers are electronegative to both the tin and the copper base.

Of more than ordinary interest in the present crisis is bulletin 219 entitled "Industrial Poisons Used or Produced in the Manufacture of Explosives," just issued by the United States Bureau of Labor Statistics. The study was made by Dr. Alice Hamilton during nine months of 1916, the 41 factories visited being located in Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and Indiana, and employing about 90,000 workers. Of these approximately 30,000 were doing work exposing them to poisons, and practically no women, girls or boys were among this number. The report describes the physiological action of the poisons mentioned and then takes up in detail the processes involved in the manufacture of poisons, closing with suggestions for the prevention and treatment of cases of industrial poisoning in the manufacture of explosives. Safety standards and precautionary measures applicable to the manufacture of certain explosives, adopted by Massachusetts and Pennsylvania, and in Great Britain, appear as appendixes to the bulletin.

"Industrial Heating as a Central Station Load" is the latest booklet published by the Society for Electrical Development on selling the idea of doing things electrically. Before publishing this booklet the whole industrial heating field was carefully analyzed by the engineering staff of the society. Every fact, every theory, every practical application was looked into, with the view to publishing the very best analysis possible for the benefit of members of the society and the entire electrical industry. New conditions and the war make this book very timely. Part 1 deals with electric furnaces. Part 2, out May 10, gives in compact form for ready reference facts and data as to various uses and applications of commercial electric heating, which will apply more particularly to the smaller cities. The two books together provide a library on industrial heating.

"The 'Western's' Steel Book," edited by Erwin C. Arndts, M.E., and published by the Western Spring & Axle Co., Cincinnati, gives in its first chapter a résumé of the early history of iron and steel. Another chapter, "From Ore to Merchant Mill," gives an idea of the methods used in mining and transporting iron ore, the operations of the blast furnace, of crucible Bessemer, open-hearth steel and electric steel works, and of the rolling mill. Microstructure and physical properties of steel, critical points, heat treatment and the properties of alloy steel come in for discussion in succeeding sections and an appendix is devoted to nomenclature and bibliography. The body of the book consists of 93 pages and there are 17 pages in the appendix.

The Cleveland Engineering Society has issued a special publication in the form of a magazine containing a series of profusely illustrated articles by well-known engineers on what may be termed the popular side of developments in irrigation, public water supply, transportation, bridge building, measurement of the flow of rivers and naval architecture. It is a contribution of the society's committee on co-operation, which aims to familiarize the public with fundamental ideas concerning engineering works as the means for preventing unwise undertakings from being espoused by the people.

"Notes on the Geology and Iron Ores of the Cuyuna District, Minnesota," by E. C. Harden and A. W. Johnston, is Bulletin 660-A of the U. S. Geological Survey. The general features of the district as well as the geology, the iron-bearing formation and the iron ore are discussed.

A large force of men is putting the machines at the shops of the Jeansville Iron Works in shape for the manufacture of American shell orders recently received. As soon as the equipment has been changed, many men will be taken back. The Jeansville Works formerly employed 2500 men on a Russian shell contract which has now been filled.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

EFFECT OF WAR DECLARATION ON ALIEN'S CONTRACTS.—The federal government has power to provide for the confiscation of the property of alien enemies in this country, or for suspension of their right to sue in our courts, subject to such treaty provisions as that contained in the Prussian-American treaties of 1799 and 1828, to the effect that on war arising resident aliens shall be allowed nine months in which to collect their debts and depart freely. But the declaration of the existence of a state of war between the United States and Germany did not automatically terminate the right of German citizens to sue in American courts to enforce their just claims in private transactions. Until Congress legislates upon the subject, the right to sue exists. The fact that a corporation organized under the laws of one of the states is composed entirely of German stockholders does not deprive the company of its legal status as a citizen of the United States, although Congress would have power to prevent transfer of the company's assets to Germany. (New York City Court, Fritz Schulz, Jr., Co. vs. Raimes & Co., 164 New York Supplement, 454.)

DELAY BY BUYER IN ACCEPTING DELIVERY.—When a seller of goods contracts to ship them to a third party's warehouse and there deliver them on board cars or vessel to be furnished by the buyer within a certain time, the seller will have a valid claim against the buyer for storage charges accruing and actually incurred by the seller on account of delay of the purchaser in furnishing the necessary cars or vessel. Claim for such reimbursement is not waived by making delivery on board the cars or vessel when transportation facilities are tardily furnished. And, if it is agreed that the purchase price is to be paid only when the goods are loaded, the seller will have a valid claim against the buyer for interest at the legal rate on the amount due for the goods for the time that the seller may be kept from earning payment by reason of the buyer's delay in providing cars or a vessel as agreed. (Kansas City Court of Appeals, Bird vs. Fox, 193 Southwestern Reporter, 941.)

AUTHORITY OF SALESMEN.—A foundry company having sent a salesman to a customer to obtain an order for iron work, after negotiations had been initiated by correspondence, impliedly authorized the salesman to bind the company by closing a contract. (Arkansas Supreme Court, Chattanooga Roofing & Foundry Co. vs. Porter, 193 Southwestern Reporter, 797.)

INJURY TO EMPLOYEE IN INSTALLING MACHINERY.—An employee injured through fall of a heavy motor from a wall on which he was attempting to install it, with the assistance of two helpers, is entitled to recover damages from his employer on the theory of the latter's failure to furnish enough men to do the work properly, unless the risk involved in three men undertaking the work was so obvious that a workman of reasonable prudence would not have encountered it in the circumstances. (St. Louis Court of Appeals, Levecke vs. Curtis & Co. Mfg. Co., 193 Southwestern Reporter, 985.)

STATE CONTROL OVER NON-RESIDENT CORPORATIONS.—One state has power to prescribe by law the conditions under which corporations organized under the laws of another shall be permitted to do business of an intrastate character in the first. Accordingly, a state may validly impose a special excise tax on corporations, both domestic and foreign, doing business in the state, based on the volume of intrastate business done. (United States District Court, Northern District of West Virginia, Baldwin Tool Works vs. Blue, 240 Federal Reporter, 202.)

INJURY TO MOLDER.—In an action against a steel manufacturer for injury to a molder, caused by spurting of molten metal from a mold, it was open to the jury to find that the defendant was negligent in furnishing light caps for use in covering open molds after filling, and in failing to use aluminum in the molds to counteract tendency of the metal to spurt. (United States Circuit Court of Appeals, Sixth Circuit, Republic Iron & Steel Co. vs. Hines, 240 Federal Reporter, 77.)

COPYING UNPATENTED ARTICLES.—The rule of law which makes it unfair competition, against which relief will be granted by injunction and award of damages, for one manufacturer of an unpatented article to simulate the appearance of the product of a competitor for the purpose of diverting to himself patronage which the public intended to give to the competitor, is limited to non-functional features. All manufacturers of unpatented goods are entitled to utilize any feature which makes for efficiency or economy. (New York Supreme Court, Appellate Division, Diamond Expansion Bolt Co. vs. United States Expansion Bolt Co., 164 New York Supplement, 433.)

HOURS OF SERVICE LAW VALID.—The law enacted by the Oregon legislature in 1913, making it a misdemeanor to employ any person in a mill, factory or manufacturing establishment more than ten hours in any one day, except in the case of watchmen, emergencies in making necessary repairs, or in avoiding imminent danger to life or property, and except that there may be three hours' overtime employment on payment of time and one-half for such extra work, is a valid exercise of the police power in the interest of the public health, and not an unconstitutional attempt to fix wage standards. The last-mentioned proviso is properly interpreted as being intended as an additional means of deterring employers from exacting overtime work. There is no unconstitutional discrimination wrought by limiting the operation of the law to mills, factories and manufacturing establishments. (United States Supreme Court, Bunting vs. State of Oregon, 37 Supreme Court Reporter, 434.)

DUTY TO WARN EMPLOYEES AGAINST DANGERS.—The legal obligation of an employer to warn his workers against dangers to which they are exposed in their employment is limited to perils known to the employer and of such nature that he has no good reason for assuming from the particular employee's experience and apparent intelligence that the employee appreciates the risk. (Pennsylvania Supreme Court, Hanley vs. Carnegie Steel Co., 100 Atlantic Reporter, 543.)

DELIVERY OF FREIGHT WITHOUT BILL OF LADING.—A railway company is not liable to the shipper of an engine for delivering the same without production of the bill of lading, which was drawn to the shipper's order and attached to note sent to a collecting bank with instructions not to deliver the bill of lading to the concern to which the engine was destined until payment of the note, whereby the shipper was prevented from collecting the note, if the concern was actually entitled to possession of the engine. (Arkansas Supreme Court, Ben D. Schaad Machinery Co. vs. St. Louis, Iron Mountain & Southern Railway Co., 193 Southwestern Reporter, 270.)

CONTRACTS RESTRAINING COMPETITION.—An agreement by a manufacturer or dealer to pay a stated amount annually in consideration of a prospective competitor staying out of the field is void as being in unreasonable restraint of trade, although the courts do sanction the validity of agreements whereby the seller of an established business agrees, as part of the sale, not to compete with the purchaser. (Arkansas Supreme Court, Shapard vs. Lesser, 193 Southwestern Reporter, 262.)

"WILLFUL MISCONDUCT" OF EMPLOYEE.—A youthful employee who had been instructed not to oil machinery while in motion, thoughtlessly started to oil it after the power had been shut off but while the machinery was still running by momentum, and was injured in consequence. Held, that he was not guilty of such "willful misconduct" as debars him from an allowance under the California workmen's compensation act. (California District Court of Appeals, Diestelhorst vs. Industrial Accident Commission of California, 164 Pacific Reporter, 44.)

TO CONSERVE STEEL FOR WAR

Council of National Defense Urges Co-operation of Manufacturers

WASHINGTON, July 2.—An urgent plea that steel be used for general business purposes only when the requirement is unavoidable is made in a war bulletin just sent out by the Chamber of Commerce of the United States in co-operation with the Council of National Defense. While the chamber takes a rather extreme view with respect to the prospective steel shortage, the fact that the bulletin is being widely distributed among steel consumers gives it a very special interest at this time. It is in part as follows:

"It should be anticipated that the steel situation, which is developing with rapidity, will probably make it impossible for those general manufacturers, unable to find a steel substitute, to secure adequate supplies of steel and may even make it impossible to secure any.

"No substantial increase in production is anticipated. On the other hand, indications are that the war requirements will continue to increase. Steel is needed in war for ships, railroad cars and locomotives, rails, trucks and containers. It must be had for shells and other munitions work—requirements large in tonnage far beyond what is generally supposed. In addition, businesses producing government materials and supplies, the necessities of life and the materials for producing the necessities of life, require steel in great quantities for buildings, machinery, tools and containers. When all these requirements are met, it is said, little if any steel will be left for so-called general business. Materials which can be used in substitution for steel are plentiful in comparison. Lumber may be expected to meet all needs and cement may be had in quantity for concrete work.

"The course for business men to pursue is clear. Every effort should be made to use wood and concrete in place of steel whenever this can be done, and construction and development work requiring steel should be postponed wherever possible. Apparently little will be gained by contracting ahead for steel. Experience to-day indicates that it will soon be necessary for producers of steel to ship their product where required in connection with the war rather than to fill such contracts as they may have on their order books. When the production of railroad cars and locomotives is interfered with because necessary steel is going to industries producing pleasure automobiles, steel furniture, and buildings for amusement purposes, the situation cannot be expected to continue.

"Business men will probably make their plans in the expectation that soon there will be established an order for distribution of steel, and that the wild scramble to enter orders for future delivery of steel will be ineffective. In fact, it will occur to many, no doubt, that failure to recognize this situation may lead to unfortunate results. In a business requiring steel, if contracts are placed for future delivery, not only for steel but for other materials, the manufactuer may find that he cannot get the steel, but can get the other materials. In this case he might find that he had on hand large quantities of materials which he could not use because he had no steel.

"In purchasing materials and supplies, it is argued, business men will doubtless consider the wisdom of returning, so far as possible, to doing business locally. For many commodities the railroads can no longer spare the equipment to bring distant points into close contact. Purchase must be made near at home wherever this can be done. The preference which must be given to shipments of iron and steel will soon make this situation of daily importance.

"For the particular information of those in the iron and steel business it may be said that the Council of National Defense wishes to hear from producers of iron and steel, whenever output is limited through transportation, difficulties or through business conditions. Furthermore, pending the establishment of some method of distributing steel output according to war needs, producers of steel may render real service by assisting those producing war work to secure their steel requirements. Not only will this help win the war, but will tend toward less disturbance in business when steel supplies are shut off from those industries engaged in unessential production."

Engineering Council Organized

The Engineering Council, the engineering body which recently came into being as a medium of co-operation between the four national engineering societies, to "speak authoritatively for all member societies on all public questions of a common interest or concern to engineers," held an organization meeting in the rooms of the American Society of Mechanical Engineers on the afternoon of June 27, when the following officers were elected: President, Prof. I. N. Hollis, Worcester Polytechnic Institute; vice-presidents, H. W. Buck and George F. Swain; secretary, Calvert Townley; executive committee, the four officers named with J. Parke Channing, consulting mining engineer, and D. S. Jacobus, Babcock & Wilcox Co.

The unanimous desire to help the Government in the prosecution of the war resulted in the appointment of a committee of three, consisting of H. W. Buck, Prof. A. M. Greene, Jr., Rensselaer Polytechnic Institute, and Edmund B. Kirby, to consider the best means of utilizing the inventive ability of members of the founders' societies. The secretary was instructed to inform all Government bureaus that might be interested in the organization of the Engineering Council. The council is composed of 24 members, five appointed by each of the four large national engineering societies and four by the United Engineering Society, which operates the Engineering Societies Building.

Texas Co. to Make Improvements

At a recent meeting of the stockholders of the Texas Co., held at Houston, Texas, an increase of the capital stock of the corporation from $55,000,000 to $69,375,000 was authorized. It is announced that the additional proceeds will be used chiefly for enlarging the refining facilities of the company. It will build a large oil refinery at Tampico, Mexico, and also plans to lay a pipe line from the oil fields near Tuxpam to Tampico and to build two or more oil pumping plants. The company will organize a subsidiary corporation under the laws of Mexico to operate this project. It will erect 116 cottages for employees, a large clubhouse and an office building. The new town will be provided with electric lights and all modern conveniences and comforts. The Texas Pipe Line Co. has been incorporated at Houston with capital stock of $14,000,000 for the purpose of taking over the oil pipe line holdings in Texas of the Texas Co. R. A. John is president; J. L. Dowling, vice-president, and A. M. Donoghue, secretary-treasurer.

Locomotive Orders

Recent orders for locomotives have been 35, not including an unconfirmed report of an order for 400 narrow gage locomotives placed by the Russian Government with the American Locomotive Co. The Baldwin Locomotive Works has taken 10 locomotives for the Chicago & Alton, while the American Locomotive Co. will build 10 for the Terminal Railroad Association of St. Louis, seven for the Kansas City Southern and two each for the Chicago, Indianapolis & Louisville and the Detroit & Toledo Shore Line. It is estimated that orders this year to July 1 have been 3528, of which 1592 are for export. This total compares with 5750 ordered in all of 1916 and 2300 in 1915.

The Central Iron & Steel Co., Harrisburg, Pa., has placed its new 200-ton open-hearth furnace, recently constructed, in operation, making the ninth furnace at the plant. The new unit is of tilting type. A series of new coke ovens are now in course of erection.

Oregon Steel Plant Sold

The plant of the Oregon Iron & Steel Works, Oswego, Ore., has been purchased by William Piggott of Seattle, head of the Pacific Coast Steel Co. in the Northwest. Mr. Piggott announces that the plant will be operated in the manufacture of pig iron, ore to be brought from the west coast of South America. The plant cost $300,000 25 years ago, has a capacity of 125 tons daily, and is equipped with 800-hp. engine and boiler capacity for another engine unit. It ceased operation 20 years ago, when the supply of cheap ore in the mines nearby was exhausted. Consideration in recent purchase was $100,000. It is understood a number of improvements will be required, including installation of new machinery and complete overhauling of the plant. Mr. Piggott, president Seattle Car & Foundry Co., with his Seattle associates, acquired control of the stock of the Pacific Coast Steel Co., operating plants at San Francisco and Youngstown, about a year ago, at a cost of $1,000,000. The company has recently purchased the Irondale plant and is establishing blast furnaces at that point.

Strikes of Copper Miners May Be Serious

Strikes among the miners of several of the large copper producers are reported as assuming serious proportions. The estimated production which may ultimately be cut off by such strikes is put by some at 50,000,000 lb. per month. The great Butte mining camp in Montana with a monthly production of about 33,000,000 lb. is practically idle. Most of the trouble is ascribed to the work of German sympathizers because the unrest came suddenly. Higher wages is the demand, despite the fact that the men are now paid more than ever. The demand is for a 6-hr. day at $1 per hour, irrespective of the market price of copper, hitherto the basis for computing wages on a sliding scale. The situation, if prolonged, according to producers, is likely to have a serious effect on metal available for consumption in the last quarter. The Government and the allies are expected to use between 300,000,000 and 500,000,000 lb. before Dec. 31, 1917, according to some estimates.

Buys Foundry Iron

CINCINNATI, July 3.—(*By Wire.*)—The Standard Sanitary Mfg. Co. has bought 2000 tons of Virginia No. 3, 1000 tons of Northern and about 1500 tons of Southern, all for first half, paying full market prices.

The shipyard of Bayles & Son at Port Jefferson, L. I., has been purchased by W. B. Ferguson and associates and incorporated as the Bayles Shipyard, Inc. Mr. Ferguson, who was formerly a naval constructor, is president and general manager. A new joiner ship, two stories, 132 x 40 ft., will be completed about July 15. There will be four ways for 5500-ton ships and room for 10 or 12 small boats. Repair work will also be done. The concern is in the market for two locomotive cranes, and will soon issue a list of other needed equipment. A New York office has been opened at 115 Broadway.

The Ashland Iron & Mining Co., Ashland, Ky., expects to have in operation three additional furnaces before August 15. It is already operating three furnaces. A 144-in. plate mill has been ordered from the United Engineering & Foundry Co., and a 24-in. structural mill from the Fort Pitt Bridge Co. Both mills will be driven by General Electric motors. W. B. Seeton is president.

Homer Strong, dealer in new and used machinery, whose jobbing machinery supply house and steel warehouse are at Rochester, N. Y., has opened branch offices at Buffalo and Syracuse. The former at 380 Ellicott Square Building is in charge of G. B. Morris, and the latter at 818 University Building, Syracuse, is in charge of H. L. Roscoe.

Government Copper Purchase

WASHINGTON, July 2.—The copper committee of the Council of National Defense has arranged for the purchase by the Government of 60,000,000 lb. of copper for the Ordnance Bureau of the War Department at the tentative price of 25 cents per pound. Definite orders for this copper have not yet been given and no limit upon the date within which the copper is to be delivered has been fixed. The price agreed upon is subject to revision after the Federal Trade Commission has made its report as to the cost of producing copper.

The committee on raw materials of the Council of National Defense some time ago, as the result of negotiations with the copper producers, purchased for the Government 45,000,000 lb. of metal at 16 2/3 cents per pound. When the War Department decided that it would require a much larger quantity of copper, the producers objected to supplying the additional amount at the original price but expressed a willingness to accept a figure to be arrived at by negotiations based upon the report of the Trade Commission as to cost of production. As the producers were able to demonstrate that there had been a material increase in the expense of both mining and refining, 25 cents was fixed upon as a tentative price for all quantities in excess of 45,000,000 lb. The published statement that the War and Navy Departments will require 300,000,000 lb. additional of copper cannot be confirmed but appears to be based upon the assumption that the war will last several years.

Daylight Saving Passes Senate

WASHINGTON, July 2.—The Senate on June 28 passed as a war measure the so-called daylight-saving bill introduced by Senator Calder of New York. It provides that all clocks shall be set ahead one hour at 2 a. m. on the last Sunday in April of each year and put back one hour at 2 a. m. on the last Sunday in September. The measure also legalizes the present standard time divisions of the country.

During the debate on the bill it was asserted by its advocates that it can be put into effect without the slightest disturbance of the business or domestic affairs of the country, and especially that there is no basis for the suggestion that it will cause confusion in railroad operations or necessitate revision or reprinting of time tables. A slight readjustment will be necessary with respect to trains actually moving at the time the clocks are turned ahead and turned backward, but it is asserted that this will not embarrass the operations of the roads in any particular. Data before the Senate indicates that where the daylight saving plan has been tried abroad, notably in Great Britain, important economies have resulted, especially in the saving of coal for the production of gas and electricity. In all manufacturing plants where the plan has been tested it is said to have operated to the very substantial advantage of both workmen and employers.

Seattle Company to Build Radio Equipment

The Kilbourne & Clark Mfg. Co., Seattle, has received a contract from the Navy Department for radio equipment for 250 ships, at a cost of $988,800, said to be the greatest single contract for this line of equipment ever awarded. Contract includes one-kilowatt sets for 200 ships and two-kilowatt sets for 50 ships. Besides this the company recently received Government contracts for radio sets for 63 ships at a cost of $123,200. As a result of the recent awards the company's plant will be doubled and the number of employees increased from 100 to 300. The recent contracts give the company a total of more than $1,500,000 in signed orders for radio apparatus, including sets for nine ships for Norway interests, two sets for English ships, and several for Russian interests.

The Red Cross committee of the Pittsburgh Crucible Steel Co., Midland, Pa., has raised nearly $15,000 for the American Red Cross $100,000,000 fund.

NEW TRADE PUBLICATIONS

Electric Arc Welding.—Lincoln Electric Co., Cleveland. Pamphlet No. 104. Lists the various processes of welding such as forge or pressure welding and autogenous welding with brief descriptions of the essential features of each and their adaptability. The greater portion of the pamphlet is given over to the applications of electric arc welding in steel and iron foundries, railroad shops, shipyards, drop forge shops and general manufacturing plants. The applications are discussed at some length and cost data and views of typical installations are included.

Expansion Joints.—Ross Heater & Mfg. Co., Inc., 753 Bird Avenue, Buffalo. Folder. Gives general descriptions and specifications for a line of expansion joints of the cross-head-guided type, which were illustrated in THE IRON AGE, May 4, 1916. The joints are designed for lines carrying oil, gas, water or superheated, saturated or exhaust steam and can be supplied in all sizes up to a maximum diameter of 24 in. and pressures up to 500 lb. A number of views of installations of the joints supplement the text description.

Spray Nozzles and Filters.—Monarch Mfg. Works, P. O. Box 2070, Philadelphia. Bulletin No. 6-C. Illustrates a line of nozzles for use in acid chambers and for recooling condensing water which operate at relatively low pressures. The various features of simple construction and low operating pressure are emphasized, the text being supplemented by a number of engravings of the several styles of nozzles. The filters illustrated use either a natural stone or gravel as the filtering medium. Brief descriptions and specification tables are presented, together with instructions for cleaning.

Electric Light and Power Distribution.—L. K. Comstock & Co., 30 Church Street, New York City. Bulletin No. 4. Devoted to the cost of an electric light and power distributing system in an industrial plant. Emphasis is laid upon the fact that it is the ultimate cost of a system that counts, and the elements of this are shown diagrammatically. It is pointed out that the total cost of a distributing system is divided into two parts—the initial cost or the expense incurred before operations are begun and the future cost which goes on continuously during the life of the plant. The various sub-divisions of this future cost are touched upon, and emphasis is laid upon the elements of service which this company can supply to owners, architects and engineers in the design and installation of systems. A number of views of plants in which this company has installed the electrical distributing systems are presented, and a partial list of users, including industrial and power plants, banks, office and public buildings, etc., is included.

Lubricating Devices.—Marvel Engineering Co., 1437 Carroll Avenue, Chicago. Booklet. Points out the advantages of using the grease cup method of lubrication, such as the reduction of shutdowns due to heated and wornout bearings, elimination of time for removing and replacing oil soaked belts and saving in the amount of lubricant required. Brief illustrated descriptions of the various styles of cups are presented, supplemented by instructions for installing them. A number of test results and a partial list of users are included.

Grinding and Buffing Machine.—U. S. Electrical Mfg. Co., 459 East Third Street, Los Angeles, Cal. Folder. Mentions a motor-driven grinding and buffing machine for machine shops and all-round general use. An illustration of the machine which can be supplied for either bench or pedestal mounting is presented and the various features of construction are briefly mentioned.

Wrought Iron Pipe.—A. M. Byers Co., Pittsburgh. Booklet, entitled, "On the Trail of Byers Pipe." Presents illustrations of a large number of buildings in which the company's pipe was installed from 25 to 45 years ago for plumbing, heating, gas and power service. In connection with each illustration a brief statement is given of the length of time the pipe was in service and the purpose for which it was used.

Wagon Loader.—George Haiss Mfg. Co., Inc., 141st Street and Rider Avenue, New York. Pamphlet. Concerned with a wagon loader for handling sand, building materials, coal, etc. A number of views of the loader at work are presented and a condensed specification table is included. Cost data and a partial list of users are also given.

Refuse Destroyer and Gas Machines.—Tirrell Gas Machine Lighting Co., 103 Park Avenue, New York. Two folders. The first describes the Incinerite, which is a combined waste receptacle and destructor. A brief description of the construction of the device which is built in portable and wall types is presented, together with a condensed specification table of the various sizes. A partial list of users is also given. The other folder relates to an equalizing gas machine for power and industrial uses and the various appliances employed in connection with it. Brief descriptions and illustrations of the machine and the different appliances are presented a short statement of the advantages of using gas for power and industrial purposes is included.

Hoists.— Wright Mfg. Co., Lisbon, Ohio. Hoist Catalog No. 8. Gives illustrations and brief specification tables of a line of geared and screw bolts, differential blocks and steel trolleys. Short descriptions of the different parts of the hoist are given and a number of views of it in use in various industrial plants are included.

Forgings.—Union Switch & Signal Co., Swissvale, Pa. Bulletin No. 87. Concerned with a line of forgings for automobile, tractor, airplane, railroad and general service. The facilities of the company are briefly mentioned, including a list of the various presses and forging machines with which the plant is equipped. Lists of typical forgings of the different classes are given and illustrations showing the variety of drop forgings produced are included. Mention is also made of the facilities which the plant has for turning out steel, brass, bronze and aluminum castings.

Oxy-Acetylene Welding and Cutting Apparatus.—Prest-O-Lite Co., Inc., Indianapolis. Form No. T-248. Describes and illustrates a line of apparatus for cutting and welding metals by the oxy-acetylene process. A brief general description of the various types of apparatus and the work for which they are adapted is presented. This is followed by detailed descriptions of the different apparatus and the accessories provided with each. Mention is made of auxiliary equipment such as couplers for tanks, trucks, adapters and preheating and reheating outfits. A list of the various extra parts that can be supplied is included.

Ball Bearings.—Hess-Bright Mfg. Co., Philadelphia. Form No. 828. Illustrates the application of ball bearings to machinery and shows what precautions should be taken to preserve their efficiency. Among the points upon which emphasis is laid are the use of clean lubricant, guarding against distortion of the outer race, etc. Numerous diagrams showing the application of the bearings and emphasizing the points brought out are included.

Screw Extractor.—Cleveland Twist Drill Co., Cleveland. Two folders. Treat of an extractor for broken screws, studs, staybolts, etc., which was illustrated in THE IRON AGE, Jan. 18, 1917. The method of extracting the broken screw from the hole is gone into at some length, the text being supplemented by engravings showing the way in which the extractor works.

Underfeed Stokers.— Combustion Engineering Corporation, 11 Broadway, New York. Bulletin No. B-2. Pertains to an underfeed type of stoker for boilers handling all grades of fuel from lignite or brown coal to semi-anthracite. A description of the stoker which is supplemented by numerous illustrations is presented, special emphasis being laid upon the distribution of the air and the automatic regulation of the fuel and air supplies by a compensating type damper regulator which is sensitive to minute variations of steam pressure. The features of adaptability, ease of installation and operation and smokeless operation are all touched upon, the text being supplemented by engravings of plants in which the stokers have been installed.

Ventilating Fans and Electric Hoists.—Sprague Electric Works of General Electric Co., 527 West Thirty-fourth Street, New York. Booklet No. B-3429 and Bulletin No. 48,700-A. The first relates to a line of motor-driven ventilating fans for supplying fresh air as well as for removing steam, moist air, gases and fumes or circulating air over heating or refrigerating pipes to maintain even temperature in rooms. A brief description of the unit which consists of a motor, the fan and a supporting tripod is presented and tables of the various sizes of fans for use with direct or alternating current motors are included. The bulletin, which supersedes No. 48,700 deals with a line of cage controlled electric monorail hoists. Brief descriptions of the various types which can be supplied for use with direct or alternating current motors are presented with rating and dimension tables. A number of views of the hoist in use in industrial plants are given.

Engine Lathes.—Oliver Machinery Co., Grand Rapids, Mich. Circular. Shows a 26-in. extra heavy duty engine lathe of the single pulley drive type, arranged for either belt or motor drive. A comprehensive description of the construction of the lathe is presented with sideheads calling attention to the various parts. A condensed table of specifications of the lathe which was illustrated in THE IRON AGE, Jan. 18, 1917, is included.

Machinery Markets and News of the Works

AIRPLANE TOOLS BOUGHT

Large Orders Placed by Willys-Overland

Shipbuilding Concerns More Active—Several Concerns Making Inquiries—Government Contracts for Mine Sweepers—Munitions Plants Are Purchasers

The Curtiss Aeroplane & Motor Corporation and Willys-Overland Co. combination, of which John M. Willys will become the head, last week placed orders for machine tools aggregating several hundred thousand dollars in value. The Curtiss Corporation has contracts on hand from the United States Government and the allied governments amounting to $20,000,000. The Curtiss Corporation increased its capital stock $2,000,000 to provide capital for extensions. The Willys-Overland Co. will build a new factory in Toledo, Ohio, for making airplane engines. The Curtiss Corporation has taken additional manufacturing space in Buffalo and will erect a construction and assembling plant, one story, 100 x 200 ft., at Atlantic City. Other automobile and airplane concerns which will participate in the Government airplane program have also been in the market. The Nordyke & Marmon Co., Indianapolis, which is erecting an airplane engine plant, is inquiring for tools in the Chicago market.

Shipbuilding concerns are showing more and more activity, though quite a number which have made inquiries during the last few weeks have not closed as yet, and their delay is said to be due to the slowness of the Emergency Fleet Corporation in giving out contracts and specifications. The Downey Shipbuilding Co., 120 Broadway, New York, will issue a list this week of its requirements. The New Jersey Shipbuilding Co., whose plant is at Gloucester, N. J., is also inquiring for equipment. The Chester Shipbuilding Co., Chester, Pa., has bought several cranes and will be in the market for other equipment. The Moore Shipbuilding Corporation, successor to the Moore & Scott Iron Works, Oakland, Cal., has been buying shipyard equipment through a New York representative. The Newport News Shipbuilding & Drydock Co. has placed orders in the past week for $75,000 worth of machine tools, and other contracts are pending. The Skinner & Eddy Corporation of Seattle has made inquiries among Eastern machine-tool builders. The Bayles Shipyard, Inc., Port Jefferson, L. I., with office at 115 Broadway, New York, will soon issue a list of equipment needed for a joiner plant, and other general shipyard machinery will also be bought, including two locomotive cranes. The Fore River Shipbuilding Corporation, Quincy, Mass., is inquiring for $300,000 worth of machine tools. Work is progressing rapidly on submarine chasers for the Navy. It is understood that additional vessels of this type will soon be bought. The Government has awarded contracts for 24 mine sweepers to several Eastern shipyards. From Seattle come reports that 100 wooden ships are now being built on the Pacific Coast, and this number may soon be increased to 150. The shipbuilding payroll in Seattle, alone, is now $1,200,000 a month, as compared with $200,000 a month a year ago.

The Government has placed contracts for mines and bombs, and a number of concerns will be employed as sub-contractors. Some of these have been inquiring for machine tools. The Savage Arms Co. will make 4000 Lewis machine guns for the Government.

More price advances have been recorded. A few manufacturers of turret lathes announced a 10 per cent increase; another manufacturer of radial drills raised his prices 15 per cent., so that now the higher prices of these tools are general; sensitive drill presses were advanced 10 per cent and grinders 5 per cent. Milling machines and punching and shearing machinery are also higher in price.

Deliveries are being extended still further. Many of the large builders are sold up for the remainder of this year, and are not anxious to take on any more business. Claims for priority of shipment are being made by so many buyers that machine-tool builders are obliged in many cases to refer the matter of delivery to the Government officials.

There is considerable crane business. Most of the orders are for one, two or three cranes.

Export business shows no cessation.

New York

NEW YORK, July 2.

The closing of contracts for several hundred thousand dollars' worth of machine tools by the Willys-Overland Co.-Curtiss Aeroplane & Motor Corporation combination was the feature of the New York market the past week, it being the first large indication of the extensive manufacture of airplanes in this country. The Curtiss Corporation, at a meeting last week, announced a $2,000,000 increase in its capital stock to provide the funds for extensions. It is adding to the equipment of plants in Buffalo and Hammondsport and will build a construction and assembling plant at Atlantic City.

Staten Island is expected to become a center for steel shipbuilding in this section, and a number of yards will probably be started there soon. Projects on Newark Bay are already under way and one concern which is erecting a wooden shipbuilding plant there will lay the keel of its first ship within a few days. The Downey Shipbuilding Co., 120 Broadway, New York, which recently received a Government contract, will issue a list of its requirements this week. The New Jersey Shipbuilding Co., whose plant is at Gloucester, N. J., is also inquiring for equipment. The Chester Shipbuilding Co., Chester, Pa., has bought several cranes and will be in the market for other equipment. The Moore Shipbuilding Corporation, successor to the Moore & Scott Iron Works, San Francisco, which has a Government contract, has made purchases of punching and shearing machinery and other equipment in this market. The Skinner & Eddy Corporation, Seattle, Wash., has made inquiries among Eastern machine-tool builders. The Bayles Shipyard, Inc., Port Jefferson, Long Island, with office at 115 Broadway, will soon issue a list of equipment needed for a joiner shop; other general shipyard machinery will also be purchased. Work is progressing rapidly at various shipyards on submarine chasers for the United States Navy. A dozen of these boats have already been completed at the New York Navy Yard. It is understood that additional vessels of this type will soon be bought. Contracts for twenty-four mine sweepers have been let by the Government to about a dozen shipyards.

The Fore River Shipbuilding Corporation, Quincy, Mass.,

has issued a list of requirements for yard extensions, which include two 26-in. engine lathes, four 36-in. engine lathes, two 28-in. turret lathes, one 24-in. engine lathe, two 18-in. engine lathes, three 7-in. vertical boring mills, 6 x 8 ft., five 42-in. Bullard vertical boring mills, two No. 2 Detrick & Harvey (or equivalent), and one Fosdick (or equivalent) horizontal boring mills, four horizontal milling machines, one planer, 9 x 16 ft., two planers, 5 x 12 ft., one planer, 24 in. x 6 ft., one 24-in. shaper, two universal milling machines, two 20-in. lathes, one 3-ft. radial drill, one surface grinder for tool work, one cutter grinder, one cylindrical grinder, one 20-in. shaper and other smaller tools, and miscellaneous equipment.

The Newport News Shipbuilding & Drydock Co., Newport News, Va., has closed for about $75,000 worth of the equipment it recently inquired for. Two turret lathes were bought from the Jones & Lamson Machine Co., a bevel gear planer from the Gleason Works, a plain radial drill and three sensitive radial drills from the American Tool Works Co. The American Tool Works Co. was also awarded a contract for twelve engine lathes and the Bullard Machine Tool Co. will furnish two vertical turret lathes. Orders for milling machinery and horizontal boring mills are pending. Cranes and shipshed tools will probably be closed for this week. The new plate and angle shop which this company is now building will require four double-end plate planers, two double-end beam punches, three horizontal punches and one double-angle shear.

Ordnance and munition plants are also active in the market, but mostly to replace worn-out tools. The Government last week placed large contracts for mines and bombs, and it is understood that a number of concerns will be employed as sub-contractors. These concerns are expected to come into the market for tools. The Savage Arms Co., Utica, N. Y., is increasing its facilities to manufacture Lewis machine guns for the Government.

Price advances continue. A few manufacturers of turret lathes announced a 10 per cent increase; another manufacturer of radial drills raised his prices 15 per cent; sensitive drill presses were advanced 10 per cent and grinders 5 per cent. Milling machines also went up. Punching and shearing machinery has also been advanced by some of the makers.

Deliveries are being extended still further. Many of the large builders are sold up for the remainder of this year and are not anxious to take on any more business. Claims for priority of delivery on the plea of urgent Government work are being made by so many buyers that machine-tool builders are obliged in many cases to refer the matter of delivery to the Government officials, letting them decide which buyer should come first.

There is considerable crane business. Most of the orders are for one, two or three cranes. The Chile Exploration Co. division of the American Smelting & Refining Co., which recently inquired for about 26 cranes, has curtailed its requirements, and will not close for a week or so. A considerable number of machine tools is also being purchased by this company. The West Virginia Pulp & Paper Co., Williamsburg, Pa., has bought a 15-ton crane.

Export business shows no cessation so far as the allied countries are concerned. While officials at Washington are considering the question of establishing an embargo on certain shipments to neutral countries contiguous to Germany, it is interesting to note that the restrictions now in effect are so far-reaching that they are having almost the same effect as the most severe embargo. One concern has recently refused business from Spain because of a belief that the machinery was to be used for a purpose that would be indirectly beneficial to Germany. South Africa is buying machine tools here which before the war were always bought in England. Representatives of the Tata Iron & Steel Co., Ltd., Sakchi, India, have closed for the tools which were required for additions to that concern's plant.

The Earp Thomas Metal Products Co., Newark, has been incorporated with a capital of $50,000 to manufacture metal goods. G. S. Earp Thomas, Oswald Earp Thomas, Glen Ridge, and W. E. Atkins, Newark, are the incorporators.

Fire recently destroyed the pattern shop of Maher & Flockhart, iron founders, Polk Street, Newark, with a loss estimated at about $10,000.

J. & W. Lyall, Passaic, N. J., operating a plant on Brighton Avenue for the manufacture of textile machinery, has been incorporated under the name of the J. & W. Lyall Loom & Machine Co., with a capital of $50,000, to provide for proposed extensions. The incorporators are William J. Lyall, H. V. R. Scheel, and Timothy Kelly.

The Bayonne Bolt & Nut Co., Second Street, Bayonne, N. J., manufacturer of bolts, spikes, nuts, etc., will build an extension to its plant at Humphrey Avenue and Second Street, to cost about $8,000.

The Charles V. Hoffman Co., Jersey City, N. J., has been incorporated with a capital of $25,000 to manufacture boiler equipment. The incorporators are Charles V. Hoffman, Louis L. Browne and Charles F. Dayton.

Edward V. Hartford, Inc., 141 Morgan Street, Jersey City, manufacturer of shock absorbers, has filed plans for a one-story addition to its plant. It is also known as the Hartford Suspension Co.

The Zealandia Co., Jersey City, has been incorporated with nominal capital of $5,000 to manufacture mill machinery. C. H. Jarvis, J. Frank Turner and Philip L. Neieser are the incorporators.

The New Jersey Shipbuilding & Dredging Co., Jersey City, has been incorporated with a capital of $500,000 to operate a shipbuilding plant. The incorporators are E. C. Moore, Tribune Building, New York; John F. Clarke, East Twenty-eighth Street, Bayonne; and A. P. Margolies, Jersey City.

The Pintsch Compressing Co., 206 Erie Avenue, Jersey City, manufacturer of gas fuel tanks, will erect a one-story addition to its works at 310 Wayne Avenue.

The Thomas & Betts Co., 215 Broad Street, Elizabeth, N. J., has been incorporated with a capital of $300,000 to manufacture surgical and scientific apparatus. The incorporators are Richard D. Betts, Lewis H. George and Robert McK. Thomas.

The Canadian Car & Foundry Co., 165 Broadway, New York, is negotiating with the Board of Commissioners, Lyndhurst, N. J., for the rebuilding of its plant, recently destroyed by an explosion.

John Vereb, Jr., 669 State Street, Perth Amboy, N. J., contractor, will erect a one-story machine shop on Cortlandt Street.

The Standard Underground Cable Co., 26 Washington Street, Perth Amboy, N. J., is building an extension to its plant.

The Downey Shipbuilding Corporation, 120 Broadway, New York, has commenced work on its proposed shipbuilding plant at Milliken, Staten Island. The company, recently organized with a capital of $10,000,000, has acquired the structural steel and iron plant of Milliken Brothers, Inc., including about 1800 ft. of water-front property, which will be used for the new works. Six ship berths will be installed, and an extensive shipbuilding plant equipped to handle an order received from the Government. Wallace Downey is head of the company.

The American Die & Tool Works, New York, has been incorporated with a capital of $25,000 to manufacture automatic machinery, dies and tools. The incorporators are G. L. Goshco, C. Wassill and J. Lucher, 2173 Pacific Street, Brooklyn.

The Super-Diesel Traction Corporation, New York, has been incorporated with a capital of $10,000 to manufacture tractors and agricultural machinery. E. A. Rumely, C. A. Lewis and R. A. Rudd, 25 City Hall Place, are the incorporators.

The E. K. Die Works, Inc., Brooklyn, N. Y., has been incorporated with a capital of $10,000 to operate a die manufacturing plant. The incorporators are C. and E. Klagges and G. J. Ellisberg, 371 West Twenty-third Street, Brooklyn.

The McCarthy Drill & Tool Corporation, New York, has been incorporated with a capital of $325,000 to manufacture drills, machinery and tools. The incorporators are C. H. McCarthy, O. S. and B. E. Mitler, 30 Church Street, New York.

The Jupiter Machine Mfg. Co., New York, has been incorporated with a capital of $50,000 to operate a plant in Richmond Borough, Staten Island, for the manufacture of punching and shearing machinery. E. A. Dippel, C. A. Stitch, and G. M. Thompson, 221 West Twenty-first Street, are the incorporators.

The Fifth Avenue Coach Co., 10 East 102nd Street, New York, has acquired property at 132nd Street and Broadway for the erection of a four-story plant for the manufacture of motor buses. The proposed plant is estimated to cost about $1,000,000. R. W. Meade is president.

The Wisconsin Brass Corporation, New York, has been incorporated with capital of $20,000, to manufacture brass and sheet tubing. The incorporators are R. Victor, A. S. Ridley and E. H. Green, 49 Wall Street.

W. M. Messersmith, Edward E. Adams and Edward W. Jansen, New York, have incorporated, in Delaware, the Superheater Co., with capital of $10,000,000, to manufacture superheaters for locomotives and marine engines. James Addison, Garden City, and J. P. Weaver, Woodhaven, L. I., are also interested.

The Tock Screw Machine Products Corporation, Flush-

ing, L. I., has been incorporated, with capital of $50,000, to manufacture automatic and screw machinery. The incorporators are C. R. and V. O. Tock and H. A. Tremaine, Flushing.

The Norwich Wire Works, Norwich, N. Y., has increased its capital from $25,000 to $100,000.

The Ross Valve Mfg. Co., Troy, N. Y., operating a plant at Sixth and Oakwood avenues, has been incorporated with capital of $40,000, to manufacture valves and other specialties. The incorporators are J. C. and A. Ross.

The Bartlett All-Steel Scythe Co., Geneva, N. Y., has increased its capital from $75,000 to $250,000.

The Curtiss Aeroplane & Motor Corporation, Buffalo, has increased its capital from $6,750,000 to $7,515,000 for extensions.

The Efficiency Gas Generator Co., Inc., Buffalo, has been incorporated, with a capital stock of $50,000, to manufacture oil gas generators. The incorporators are Garritt VanDaam, John H. Stevens and William H. Godbold, Brisbane Building, Buffalo. A manufacturing plant is to be established soon.

The Johnston Harvester Co., Batavia, N. Y. organized in 1870, has been succeeded by the Massey-Harris Harvester Co., Inc., with capitalization of $3,000,000. The greater amount of stock in the new company will go to the members of Massey-Harris Company, Ltd., Toronto, Ont., which had the controlling interest in the Johnston Harvester Co.

Gooley & Edlund, Cortland, N. Y., will build a one-story factory, 60 x 160 ft., to cost about $25,000.

The I. G. Jones Co., Inc., Syracuse, N. Y., has been incorporated, with a capital of $50,000, by I. G. Jones, H. L. Betts and F. C. Faulkner, to manufacture engines, boilers, etc.

The H. Bridgman Smith Co., Brooklyn, N. Y., does not expect to build for several years upon its recently acquired property at Kingsland, N. J.

The Corrugated Fibre Mills, Inc., New York, is the purchaser of 5 acres of land and a factory building at Mill Basin, Jamaica, L. I., and not the Paper Working Machines Co., as was recently stated. The former company has no connection with the latter.

New England

BOSTON, June 30.

Capacity production is still the order of the day in New England factories. A large volume of munitions orders is coming into New England, but, in response to the Government's request, little talk is being made about them, and no details are being published. The Fore River Shipbuilding Corporation has issued a list of machine tools of the larger sizes, amounting to about $300,000 in value, which it is reported, will be bought directly for Government account. No large lists for private account have been reported, but numerous sales of small lots are keeping the order books full.

Machine tool builders are strengthening their own equipment in all departments, and deliveries of new tools have not sufficiently improved to affect the second-hand dealers. There is a huge demand for rebuilt or good second-hand machines of the larger sizes of all types, particularly from the Middle and Far West. If the story of the travels of some of the second-hand tools that have been shipped out of Boston in the last few days could be written, it would furnish an interesting side light on the rapidly changing conditions in individual plants during wartime industry.

One of the older New England arms factories, which a few months ago was looked upon as a promising "war baby," has gone into receivers' hands, and one of the best-known lathe and planer plants has been acquired by the Robert F. Herrick interests that have taken over several other machine tool concerns since 1915.

The General Ordnance Co. of Connecticut has taken over the entire assets of the Delaware corporation of the same name. The outstanding capital is $2,100,000; the authorized capital, $3,000,000. The company, whose plant is located at Derby, Conn., manufactures the Davis non-recoil gun, for which it has large orders, and besides a general ordnance business, makes air compressors and similar machinery.

Interests representing Robert F. Herrick, Boston, have secured virtually all of the common stock of the Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., amounting to $200,000, and some of the preferred stock of which $150,000 is outstanding. Mr. Herrick is president of the Reed-Prentice Co., Worcester, and is reported to have heavy holdings of stock in many other New England industrial companies, including the Becker Milling Machine Co., Hyde Park, Mass., and the Wyman & Gordon Co., Worcester.

The Hopkins & Allen Arms Co., Norwich, Conn., has been petitioned into a receivership by the Billings & Spencer Co., Hartford, Conn. Edwin W. Higgins, vice-president of the Hopkins & Allen Arms Co.; Leon J. Garcey, comptroller of the same company; and Lewis D. Parker, Billings & Spencer Co., have been appointed receivers. John A. McGregor is president of the company, which has outstanding obligations amounting to several millions. The Hopkins & Allen Arms Co. has contracts from the Belgian Government for 140,000 Mauser rifles at $27 a rifle, and 10,000 rifles at $28 a rifle. About 11,000 rifles have been delivered. Over 1500 hands have been laid off, most of them being immediately taken over by other Connecticut munitions plants. One report states that the Belgian Government will pay a higher price for the completion of the contract if the receivers decide to continue manufacturing operations; another report is that the business will be taken over by the Colt's Patent Fire Arms Co., Hartford.

The Rockwood Sprinkler Co., Worcester, has increased its capital from $260,000 to $360,000.

The Worcester Foundry Co., Worcester, has awarded a contract for a foundry, 52 x 198 ft., at 180 Prescott Street.

The International Casket Hardware Co., Meriden, Conn., has gone into voluntary bankruptcy, with liabilities of $87,954.24, and assets of $58,275.20. The International Silver Co., Meriden, holds a chattel mortgage for $40,000.

The Koehler Mfg. Co., Marlboro, Mass., has been incorporated with authorized capital stock of $50,000, to manufacture miners' and safety lamps, igniters, etc. The directors are: H. G. Powning, president; Walter S. Field, treasurer, and H. G. Lapham.

The American Crucible Co., Boston, has been incorporated with authorized capital stock of $150,000. The directors are: Lyon Weyburn, president; William E. McKee, 504 Center Street, Newton, treasurer; and V. H. Mayr.

The Morse Twist Drill & Machine Co., New Bedford, Mass., has let a contract for an addition to its plant.

The International Engineering Works, Framingham, Mass., has been incorporated with authorized capital stock of $500,000. The directors are William B. Hamlin, president; Leland Wells Pollock, Wakefield, treasurer; and Jane A. Hay.

The Boston Starter & Specialty Co., Boston, has been incorporated with authorized capital stock of $10,000. The directors are E. P. Thompson, president; Edward C. Ramsdell, 44 Riverview Road, treasurer; and R. S. Almeder.

The Gildersleeve Ship Construction Co., Portland, Conn., has been incorporated with authorized capital stock of $100,000, by Alfred Gildersleeve and Oliver Gildersleeve, Jr., town of Gildersleeve, and B. C. Stone, Middletown.

The Aerocruiser Corporation of America, Augusta, Me., authorized capital $1,000,000, has been incorporated. E. M. Leavitt, Augusta, is president and treasurer.

The Wright Wire Co., Worcester, has awarded a contract for new buildings which will practically double the capacity of its Palmer, Mass., plant. Besides an annealing shop, an addition to the wire rope mill, and a lime storage building, 30 workmen's homes will be erected.

Philadelphia

PHILADELPHIA, July 2.

The American Metal Co., Stenton Avenue and Rockland Street, Philadelphia, has awarded a contract for the construction of a two-story brick addition to its plant, about 65 x 325 ft., to cost $90,000.

The De Long Hook & Eye Co., Broad and Wallace streets, Philadelphia, manufacturer of metal specialties, is having plans prepared for a four-story, reinforced-concrete plant, 80 x 240 ft., at Twenty-first and Clearfield Streets. A one-story power plant will also be constructed.

The Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, manufacturer of storage batteries and electrical supplies, will erect two one-story additions to its plant.

The Philadelphia Drying Machine Co., Westmoreland Avenue and Stokley Street, Philadelphia, has awarded a contract for the construction of a one-story shop and power plant addition, about 220 x 220 ft., to cost $40,000.

The Midvale Steel Co., Widener Building, Philadelphia, will build a two-story pattern and wood-working shop, 46 x 130 ft., at its Nicetown works.

The H. C. Gray Co., Philadelphia, has acquired property at 1322-26 Mount Vernon Avenue, as a site for a

machine plant, to specialize in automobile work, and to cost about $15,000.

William Sellers & Co., 1600 Hamilton St., Philadelphia, manufacturers of machinery, will erect a one-story extension, 14 x 20 ft., at Sixteenth and Hamilton streets.

The Biddle Motor Car Co., Philadelphia, has increased its capital from $100,000 to $250,000 for proposed expansion.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids up to July 27, for three one and two-story, brick and reinforced concrete shop additions at the Frankford Arsenal, Philadelphia.

Henry Potts & Co., Real Estate Trust Building, Philadelphia, will purchase a number of 200-hp. horizontal return tubular boilers, and 100-hp. locomotive boilers.

The Montgomery Iron & Steel Co., 1832 North Ninth Street, Philadelphia, manufacturer of structural shapes and other iron and steel products, will construct a new shop to cost about $5,000.

The William Cramp & Sons Ship & Engine Building Co., Beach and Ball streets, Philadelphia, has filed plans for the erection of a one-story addition to its works, at Almond Street and Boston Avenue.

The Ridge Avenue Iron & Metal Co., 1016 Ridge Avenue, Philadelphia, will make extensions in its plant at 328-30 Noble Street, to cost about $3,000.

The Pennsylvania Forge Co., Wakeling and Bermuda streets, Philadelphia, manufacturer of iron and steel forgings, has secured about 25 acres at Jenks and Bath streets, for future extension. Charles C. Davis is president.

The Electric Cushion Armor Co., Camden, N. J., has been incorporated with a capital of $125,000 to manufacture machinery and a special protective device for ships. George Brooks, Samuel Hough, and William H. Dilmore, Camden, are the incorporators.

The Curtiss Aeroplane & Motor Corporation, Buffalo, N. Y., has acquired property at Caspian and Maine avenues, Atlantic City, N. J., for a plant. The initial structure, to consists of work shops and assembling department, will be one story, 100 x 200 ft., and cost about $20,000.

The Edgemont Iron Works, Edgemont, Pa., is taking bids for the erection of a two-story reinforced concrete addition, 32 x 80 ft.

The Reading Iron Co., Baer Building, Reading, Pa., manufacturer of pipes, tubing, iron and steel forgings, etc., is building an addition to its forge shop at the North Reading works.

The Valley Iron Works, 233 West Street, Williamsport, Pa., specializing in the manufacture of stationary engines, has awarded a contract for the erection of a two-story addition, about 30 x 60 ft.

The Home Torpedo Co., Bradford, Pa., has been incorporated in Delaware with a capital of $25,000, to operate a plant for the manufacture of torpedoes and auxiliary specialties. R. S. Pringle, Carl K. Dresser and H. M. Wick, Bradford, are the incorporators.

The International Money Machine Co., Terre Haute, Ind., is arranging for the immediate occupancy and operation of its new plant at Reading, Pa. It is said that the company will move considerable machinery from its Terre Haute works for installation at the new factory and purchase other equipment.

The Autocar Co., Lancaster Avenue, Ardmore, Pa., manufacturer of automobiles and parts, is having plans prepared for a five-story reinforced-concrete addition.

Clarence Coughlin, Wilkes-Barre, Pa., and associates, have incorporated in Delaware the Mann Metals & Iron Co., with capital of $20,000, to operate a plant in the vicinity of Nanticoke. Other incorporators are Morris Mann, Nanticoke, and Frederick Streng, Laurel Run.

The Jeanesville Iron Works, Hazleton, Pa., is making extensive improvements in its plant and machinery to provide for the manufacture of shells. The equipment will be remodeled and rebuilt to handle the special work.

The Maccar Truck Co., Cliff Street, Scranton, Pa., manufacturer of automobile trucks and parts, is having plans prepared for a one-story addition, about 40 x 65 ft.

The C. Hammond & Son Co., Ogontz, Pa., has been incorporated with a capital stock of $10,000 to manufacture edge tools and hammers. The incorporators are Charles H. Culin, Ogontz; Bertha Marx, Philadelphia, and James C. Jones, 1531 North Fifteenth Street, Philadelphia.

The Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., manufacturer of pipe, boilers, tanks, etc., has acquired a tract of about five acres, adjoining its plant near Maclay Street and the Paxton Canal, to be used for future extensions.

Baltimore

BALTIMORE, MD., July 2.

The McNamara Brothers Co., Inc., Ranstead's Wharf, Baltimore, manufacturer of tanks and boilers, has commissioned Herman F. Doehlman, 1101 American Building, to prepare plans for a steel plate tank factory, a boiler plant, and an office building to be erected at Bush Street and the Baltimore & Ohio Railroad.

The Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, John M. Hood, president, has awarded a contract for the construction of an additional factory at Canton, Md.

The Baltimore Copper Smelting & Rolling Co., Baltimore, recently incorporated with a capital of $100,000 to manufacture copper and metal products, has filed articles in New York to operate in that district. W. C. Dickey, 519 West Twenty-third Street, New York, is local representative.

The Chesapeake Iron Works, Baltimore, has commenced the erection of an addition, 45 x 90 ft., for the manufacture of electric traveling cranes. R. C. Sandlass is general manager.

The Charlotte Truck & Tractor Co., Charlotte, N. C., has been incorporated with a capital of $50,000. John B. Ross, B. A. Hawkins, and G. E. Dennis are the incorporators.

The Chrisman Foundry Co., Westover, W. Va., has been incorporated with a capital of $100,000. The incorporators are A. H. McBee, Frank Fox, and E. F. Beall, all of Morgantown.

The Chesapeake Iron Works, Baltimore, Md., is now engaged in the manufacture of electric traveling cranes of three-motor, direct-current type of from 5 to 30-tons capacity and up to 60-tons, five-motor double trolley, any span. Fairly early deliveries are being promised.

Chicago

CHICAGO, July 2.

No developments of a stirring nature are to be found in this market. Action on the Chicago & Northwestern list was expected this week, but it is generally reported that nothing has been done. Inquiries for heavy machines have been received from Pacific coast shipyards, and a few machines have been shipped to Atlantic coast yards. Business on wareroom floors has been a little more brisk, and June closed better than was expected.

Except for the large orders placed a few weeks ago for munitions-making equipment, there has been little activity of that character in this territory. An Indianapolis company which successfully handled a foreign contract for shell parts is holding its equipment in the hope of getting a similar order from the United States Government. A large Milwaukee company that made a great many shells is also awaiting a Government order. It is expected that the Nordyke & Marmon Co., Inc., Indianapolis, will buy some equipment in this city for the manufacture of airplane engines, but so far they have made only tentative inquiry.

The price advances on radial drills and planing machines, referred to a week ago, apply to practically all machines of their kind.

Armour & Co., Chicago, have prepared plans for a two-story reinforced concrete mechanical shop, 110 x 304 ft., on West Thirty-ninth Street and Packers' Avenue, Chicago. The estimated cost is $70,000.

Contracts have been awarded for the construction of a three-story, heavy mill construction factory, 100 x 175 ft., at 3548 to 3558 Shields Avenue, Chicago, for the Peacock Estate, at an estimated cost of $100,000. The building has been leased, but the name of the lessee has not been announced.

The City Council, Chicago, has passed several ordinances which will give the city riparian rights of the shore owners on Lake Calumet, in exchange for submerged lands which will lead to the development of the lake as an inland harbor.

The Illinois Engineering Co., Chicago, has purchased a building at the northeast corner of Racine Avenue and Twenty-first Street, which will be used for the manufacture of vapor and vacuum heating equipment.

The Krom Nik Gear Co. has been incorporated, with a capital stock of $50,000, to manufacture gears of alloy steel. Among the incorporators are Carl T. Murray and Edward McK. O'Bryan, 39 South LaSalle Street, Chicago. One of those actively interested is J. W. Fulton, 901 South Michigan Avenue, Chicago.

Julian Grear, Metropolis, Ill., is completing the erecting of a one-story brick machine shop, 50 x 100 ft., to replace a building destroyed by a storm last spring.

Work will soon be started on the construction of a plant for the Harrison Steel Castings Co., Murphysboro, Ill. The contract calls for the delivery of the fabricated steel by July 1. J. W. Harrison is president.

Col. G. W. Burr, commandant of the Rock Island Arsenal, Rock Island, Ill., recently returned from Washington, D. C., where he discussed details of contracts for the construction of a caisson factory to cost $2,250,000. He was in conference with General Crozier, Chief of Ordnance.

Extensive improvements are being made to the plant of the Mayer Brothers Co., Mankato, Minn. An extension, 36 x 116 ft., is being added to the foundry, and to the machine shop an addition 40 x 80 ft., both of brick and concrete, to cost about $3,000 respectively. The company manufactures motor-driven power hammers, and has just completed an order for the Government.

The East Chicago Foundry Co., East Chicago, Ind., has been incorporated with a capital stock of $30,000. The incorporators are H. C. Stuart, H. S. Evans, P. S. Graver and W. F. Graver.

The Racine Metal Cutting Machine Co., Racine, Wis., has been incorporated with a capital stock of $5,000 by J. E. Pritchard, H. K. Pritchard and L. W. Klinkert.

The Farm Power Equipment Co., Chicago, has been incorporated in Delaware with capital of $2,500,000, to manufacture gas engines, farm tractors, etc. The incorporators are W. R. Donaldson and J. E. Harper, Chicago; and James H. Aye, Oak Park, Ill.

The 3P Auto Tractor Co., Davenport, Iowa, recently organized with a capital stock of $50,000 to manufacture a tractor attachment for Ford cars, is installing the necessary equipment and within a few weeks expects to be turning out the finished attachments.

The Landover Autotruck Co., Chicago, a Delaware incorporation, has increased its capital stock from $300,000 to $1,500,000.

Milwaukee

MILWAUKEE, July 2.

A feature of the Milwaukee local machine-tool industry the past week has been the general receipt of inquiries for milling machines from Government arsenals and private ordnance makers closely affiliated with Federal interests. This is the first instance of prospective Government business to be noted here. Bookings from the usual domestic sources the past week have been maintained at the average of the last two years or more, but are still confined to single machines or small lots. Orders are of a scattering nature and come from the Pacific coast and widely distributed points. One large interest looks upon the proposed prohibition of exports with much favor, inasmuch as such action would relieve to some extent the sold-up condition on numerous types of tools which are badly needed by domestic buyers.

The demand for steam generating equipment continues good, and one important hydroelectric project is in prospect in Wisconsin this year.

The foundry trade shows great activity, and further announcements of extensions of plants have recently been made in this district.

The Globe Seamless Tubes Co., Milwaukee, is contemplating extensions and improvements involving, it is said, approximately $100,000. A number of additions, including one to the tube mill, are contemplated, and the entire plant will be overhauled and new equipment installed. The project has not fully matured, and an engineer has not yet been selected. F. J. O'Brien is general manager.

The Lasure Clutch Co., Madison, Wis., maker of transmission devices for gas engines, has decided to move its plant and headquarters to Watertown, Wis., where manufacturing quarters have been provided. The company is being reincorporated under the style of the Lasure Friction Clutch Co. of Watertown, with a capital stock of $60,000, of which $20,000 will be preferred and $40,000 common stock. The equipment is being moved from Madison, and the company will resume operations at Watertown about July 10 or 15.

The Harley-Davidson Motor Co., Milwaukee, has awarded contracts for the erection of a one-story fireproof addition, 35 x 75 ft., to its main testing shop at Thirty-eighth and Cold Spring Avenues.

The Western Fixture Co., Milwaukee, which recently completed the erection of a new machine shop, welding and cutting plant, and factory at 1402-1406 Weil Street, has changed its name to Milwaukee Cylinder Grinding Co. It will specialize in gas engine repairs, but will continue to manufacture metal display fixtures. Felix Biegelaar is general manager.

The Belle City Mfg. Co., Racine, Wis., maker of agricultural implements and farm machinery, has awarded contracts for the erection of a brick and steel foundry and machine-shop addition, 50 x 100 ft.

The Ransom Mfg. Co., Oshkosh, Wis., maker of grinding machines and other tools, has awarded contracts for the erection of a shop addition.

The Peninsular Power Co., Chicago, and Iron Mountain, Mich., has been granted permission to issue $500,000 of new 7 per cent preferred stock, the proceeds to be used for the construction of a hydro-electric plant on the Brule River, in Florence County, Wis., near Florence.

The National Pie Crust Machinery Co., Milwaukee, has been incorporated with a capital stock of $100,000, to manufacture electrical baking machinery. For the present the machines will be manufactured under contract by the Andrew Motor Mfg. Co., 834 Muskego Avenue, Milwaukee. The officers are: President, A. L. Fierlein, Chicago; vice-president, Leland Wilcox; secretary-treasurer, A. C. White, both of Des Moines, Iowa.

The Geuder, Paeschke & Frey Co., Milwaukee, is to erect a two-story brick and mill addition, 56 x 125 ft., to its sheet metal and enameled ware plant at Fifteenth Street and St. Paul Avenue.

The Stalwart Mfg. Co., Milwaukee, has been incorporated with a capital stock of $2,000 to manufacture patented devices. The corporators are Harry S., Theodore, and Herbert Schroeder; Frank A. Gauger, Julius F. Ruts and Max Fiedler.

The Geuder, Paeschke & Frey Co., Milwaukee, manufacturer of tin and sheet metal ware and stampings, has awarded contracts for the erection of a two-story factory addition, 55 x 137 ft., to cost $30,000 with equipment. The work is in charge of Klug & Smith, consulting engineers, Mack Block, Milwaukee.

The Line Material Co., South Milwaukee, Wis., maker of supplies and materials for electric power, telephone and transmission lines, will manufacture a special automatic fuse plug. J. P. Arndt, formerly of Neenah, Wis., has joined the company.

Cleveland

CLEVELAND, July 2.

The demand for machine tools for Government requirements is increasing, and a number of inquiries for fair-size lots of machines are pending from northern Ohio manufacturers, who either have taken or are figuring on Government orders. The McMyler-Interstate Co., Cleveland, has taken a large order for forgings for 3-in. guns, and is in the market for equipment for rough machine work on the casings and tubes. The Imperial Munition Board of Canada has come to the aid of some Central Western and Canadian manufacturers who have orders for engine parts of the English type of airplane motor, and has succeeded in getting about a dozen machines. A number of American engineers are understood to be working on the development of new types of airplane motors that will withstand the service required at the front.

Motor truck makers and shipyards are calling for additional property for a factory at Detroit Avenue and West active. There is a steady call for small lots of automatic screw machinery, but no large inquiries are pending. The demand for cranes continues heavy. A Government order for four large cranes for the Pacific coast has been placed with a Cleveland manufacturer.

The Ohio Blower Co., Cleveland, has acquired additional property for a factory at Detroit Avenue and West Ninety-third Street, adjoining the first unit of its new four-story building, 60 x 200 ft., it has erected for the manufacture of automobile bodies.

The Warner & Swasey Co., Cleveland, has placed a contract for a one-story machine shop, 200 x 200 ft., on the site which it recently purchased.

The Kremer-Cummins Machine Co., Cleveland, has been incorporated with capital stock of $15,000 by Robert W. Kremer, Robert R. Cummins and others.

The American Steel & Wire Co., Cleveland, has taken out a permit for a coal-storage and coal handling plant and a one-story mill building.

The Trelectric Machinery Co., Cleveland, has been organized with capital stock of $25,000 by William C. Tregonning, J. A. Boyden, H. N. Pettibone and others, to manufacture electrical appliances.

The Fulton-Pit Car & Mfg. Co., Canal Fulton, Ohio, has purchased the plant of the Kenova Mine Car Co., Kenova, W. Va., now under construction.

The Taylor Coupler & Castings Co., Toledo, is completing a factory building, 60 x 125 ft., and plans to erect another soon.

The plant of the Rex File & Saw Co., Newcomerstown, Ohio, recently burned, will be rebuilt by Heller Brothers, Newark, N. J., who recently purchased the business.

The plant of the Seneca Chain Co., Kent, Ohio, has been purchased by the Stewart Electric Co., Cincinnati, from Fishel & Marks, Cleveland. No announcement has been made as to the disposition of the plant.

The Greene Aeronautical Co., Elyria, Ohio, has been organized to develop a mechanical device for controlling the movement of airplanes, and is purchasing some machinery for an experimental plant which it has opened in charge of Otto M. Greene, the company's engineer.

The Zahner Metal Sash & Door Co., Canton, Ohio, has increased its capital stock from $600,000 to $2,000,000. This, it is stated, has been necessitated by the growth of business and additions required.

The Selas Co., Canton, Ohio, is planning to move its branch plant in Canton to New York, where it will be combined with its main plant.

The Clauss Shear Co., Fremont, Ohio, has commenced the erection of a one-story concrete addition, 40 x 160 ft.

The J. H. R. Products Co., Willoughby, Ohio, will erect a new plant, 75 x 200 ft., for the manufacture of chemicals.

The Keough Automobile Direction Indicator Co., Mansfield, Ohio, has been incorporated with a capital stock of $15,000 by Z. Keough and others, and plans to establish a plant for the manufacture of an electrical operated device.

Cincinnati

CINCINNATI, July 2.

Prompt deliveries can now be made on some sizes of lathes, as well as screw machines. The demand for shaping machines is very good, as these are needed by makers of war munitions for making dies. There is also a heavy call for boring and turning mills, principally from rubber tire manufacturers.

Quite a number of local sub-contracts for munitions have been let, in which may be included small parts for submarines. A southern Ohio rolling mill has a large contract for rolling and forging shell rounds for the Government, and at Dayton, Ohio, several firms have large contracts for shell work, some of which is now under way. Very little new equipment is being bought by the Dayton companies, as their plants were previously equipped to manufacture munitions for the Allies.

Labor troubles in this vicinity are mostly confined to Hamilton, Ohio, where three paper manufacturing plants are closed. A large foundry in that city, whose molders struck three weeks ago for recognition of the union, is still idle.

The Ideal Concrete Machinery Co., Cincinnati, has been incorporated with $140,000 capital stock by N. H. Beckman and others. It will add equipment to its plant on Colerain Avenue.

The Hamilton Machine Tool Co., Hamilton, Ohio, will build an addition to its plant, 40 x 200 ft., of brick and steel, which it expects to have in operation before Sept. 1. Most of the equipment will be of the company's own manufacture.

The Columbia Machine Tool Co., Hamilton, Ohio, which recently acquired the business of the Ceramic Machinery Co., will manufacture machine tools, making a specialty of shaping machines. A plant, 66 x 190 ft., of brick and steel, is being erected, and will be in operation at an early date. E. S. Rich, formerly with the Hamilton Machine Tool Co., is secretary.

The Dayton-Wright Aeroplane Co., Dayton, Ohio, has acquired the new plant of the Domestic Engineering Co., at Moraine City, and will equip it for the manufacture of aeroplanes. The building is 270 x 1000 ft., of concrete and steel.

The Kidder-Oswald Co. and the Dayton Adding Machine & Time Lock Co., Dayton, whose merger was effected several weeks ago, contemplate enlarging their plants.

Lee A. Jones, Dayton, has purchased the plant of the Vulcan Tool Co., Dayton, and will enlarge it at an early date. It makes a specialty of tools and screw machine products.

The Buckeye Tool & Machine Co., New Philadelphia, Ohio, has been incorporated with $70,000 capital stock to manufacture milling machines and operate a jobbing machine shop. The company is in the market for machine shop equipment, including lathes, planers, shapers, screw machines, etc. The officers are: President, T. B. Stroup; vice-president and general manager, H. B. Horrold; treasurer, E. R. Mowery, and secretary, R. O. Finger.

The Ironton Fire Brick Co., Ironton, Ohio, has been incorporated with $20,000 capital stock, and is establishing a plant for the manufacture of fire brick. The officers are: President, Col. H. A. Marting of the Marting Iron & Steel Co.; vice-president, Albert C. Steece, president, Ironton Portland Cement Co., and secretary, treasurer and general manager, Claude C. Hayward, an expert fire brick manufacturer. Practically all of the equipment has been purchased, and the company expects to have its kilns in operation before Aug. 1.

The Dayton Malleable Iron Company, Dayton, is making a brick and steel addition, 110 x 160 ft., to its plant at Ironton. All equipment is bought through the Dayton office.

The Pattin Brothers Co., Marietta, Ohio, will rebuild its machine shop recently damaged by fire.

The Ashland Steel Co., Ashland, Ky., shut down July 1 for two weeks in order to make general repairs and install new equipment.

The Patent Vulcanite Roofing Co., Anderson, Ind., will operate a machine shop in connection with its new plant.

The Star Foundry Co., Covington, Ky., has increased its capital stock from $20,000 to $40,000. No additions to its plant are contemplated at present.

The Crown Hardware Mfg. Co., Dayton, Ohio, has increased its capital stock from $60,000 to $150,000.

The Kramer Brothers Foundry Co., Dayton, will erect an addition to its plant for office and warehouse purposes.

The Jaeger Machine Co., Columbus, Ohio, is moving into its new plant on Dublin Avenue.

The Pennsylvania Railroad Co. announces it will make extensive additions to its shops at Columbus. It is reported that the improvements will cost $1,000,000.

The Central South

LOUISVILLE, July 2.

Availability of materials is measuring the business in iron and steel lines at this time. High prices are tending also to hold purchases down although inquiries are numerous. The demand for casing and wire rope from the oil fields is very large and insistent. Electric motors continue in good demand. The labor situation is improving.

The Star Foundry Co., Covington, Ky., has increased its capital from $20,000 to $40,000.

The Diamond Block Coal Co., Drakesboro, Ky., is in the market for a second hand air compressor, direct connected, with capacity of 200 to 250 cu. ft. per min.

The Louisville, Indianapolis & Chicago Railroad Co. will improve its yards and shops at Lafayette, Ind., at a cost of $150,000.

The Madisonville Gin Co., Madisonville, Tenn., has been incorporated with capital of $10,000 by A. S. Jenkins, H. E. Magill, W. H. McCroskey and others to build cotton gins

John N. Adams, Charleston, Tenn., will purchase machinery equipment for a hydro-electric plant of 1800 hp.

The Angel Mfg. Co., Kingston, Tenn., has been incorporated with a capital stock of $4,000 by E. C. Angel, G. T. Cunningham, W. P. McDonald and others to manufacture automobile vaporizers and other automobile accessories.

The Pulaski Electric & Water Co., Chattanooga, Tenn., has been incorporated with capital stock of $50,000, proposing to develop water power sites and build hydro-electric plants. George B. Adams, C. O. Lindsey, G. W. Erwin and others are the incorporators.

The Clinchfield Hydro-Electric Power Co., Pressmen's Home, Tenn., has been incorporated with capital stock of $50,000 by John A. Thompson, E. K. Baldwin, M. P. Beasley, L. D. Carmack and others to develop water-power and construct hydroelectric plants.

The Trans-Mo Truck Co., Nashville, Tenn., has been incorporated with a capital stock of $20,000, to build automobile trucks. The incorporators are S. O. Edwards, Charles H. Simpson, Anthony Sudekum and others.

The Special Ford Starter Co., 433 Jefferson Street, Paducah, Ky., is planning for the immediate establishment of a plant for the manufacture of automobile starters. It is now purchasing equipment.

The Union Motor Co., Memphis, Tenn., has increased its capital stock from $40,000 to $80,000.

The Dyersburg Cotton Compress Co., Dyersburg, Tenn., has increased its capital stock from $50,000 to $75,000.

St. Louis

ST. LOUIS, July 2.

The Met-Sto-Bat Metallic Storage Battery Co., St. Louis, has been incorporated with capital stock of $50,000 by Henry Handschiegel, A. I. Jacob, John K. Sterling and others, to manufacture storage batteries.

The Primo Light & Mfg. Co., St. Louis, has been incorporated with capital stock of $50,000 by Henry C. Finck, Leo J. Bayer and Henry H. Oberschelp, to manufacture heating, lighting and power devices.

The Big Lake Drainage District, Charleston, Mo., will proceed with about $140,000 of drainage work for which considerable dredging equipment will be required. The Berthe Engineering Co., Charleston, is in charge.

The Hercules Bed Spring Co., Kansas City, Mo., a subsidiary of the Cleveland Wire Springs Co., Cleveland, Ohio, has acquired a building at 1323 West Ninth Street for manufacturing purposes. C. H. Minturn is manager.

The Spring Wheel Company, 730 Trendley Avenue, St. Louis, is in the market for lathes, bolt cutters, pressers, boilers, electric motors, etc.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., has increased its capitalization from $5,000,0000 to $50.000,000 and will increase its power production at Muskogee and elsewhere, also build and acquire plants to supply power and light. The Byllesby interests control the company.

The Ardmore Wrench Co., Ardmore, Okla., incorporated with capital stock of $40,000 by James B. Coffey, J. M. Patrick and others, will manufacture wrenches.

The Monroe Power Screw Driver Co., Shawnee, Okla., incorporated with a capital stock of $25,000 by George B. Dowdy, D. C. Monroe and H. B. House, will manufacture mechanical devices.

The Holtby Automatic Oiler Co., Mangum, Okla., has been incorporated with capital stock of $25,000 by W. H. Holtby, Coke Witt and B. V. Stover.

The Planters Gin Co., Drew, Miss., has been incorporated with capital stock of $27,500 by J. C. Newton, S. P. Rich and A. R. Stokely and will equip a cotton ginnery.

The Black Bayou Drainage District, O. C. Kulicka secretary, Greenville, Miss., is in the market for three drag line machines, seven floating dipper dredges and other equipment. The Morgan Engineering Co., Goodwyn Institute Building, Memphis, Tenn., is in charge.

S. J. Stewart, 312 Carondelet Street, New Orleans, La., is reported in the market for lathes, punch press, rotary shears, shapers and other equipment.

The Machinery Exchange Co., New Orleans, is in the market for log loaders, locomotives for logging roads and other machinery.

The Ged Iron Works, Ged, La., has been incorporated with capital stock of $27,500 by C. K. Gribble, S. J. McGee and T. T. Damon to equip an iron works and machine shop.

Texas

AUSTIN, TEX., June 30.

An unusual amount of activity is reported in enlarging industrial plants and constructing new ones, with the demand for machinery and equipment exceptionally good. The call for small tools is also satisfactory.

The San Antonio Traction Co. and the San Antonio Gas & Electric Co. are to be merged into a new corporation, to be known as the San Antonio Electric Co. It will have a capital stock of $4,700,000, and plans to construct an interurban electric line between San Antonio and Austin, a distance of 82 miles.

The Farmers Gin Co. will build a cotton gin at Cleburne to cost $15,000. J. M. Helsley is a stockholder.

McBride & Law, Beaumont, shipbuilders, have secured a contract from the Government to construct four wooden ship hulls, to cost approximately $200,000 each.

The Universal Shipbuilding Co., which is building a shipyard at Houston, has secured a contract from the Government for the construction of 12 wooden ships. B. L. Waggoman, Fort Worth, is head of the company.

The National Shipbuilding Co., Orange, has been incorporated and will construct a shipbuilding plant at a cost of about $100,000. J. M. Dullahan is a stockholder.

The Hughes Tool Co. has purchased an 8-acre site near Houston, upon which it will construct a plant for the manufacture of tools.

The Pacific Gas & Electric Co., Phoenix, Ariz., will issue $555,000 of bonds, the proceeds of which will be used in enlarging its electric power plant and making other improvements.

California

LOS ANGELES, June 26.

The Crellin Machine Co., 121 West Railroad Street, Los Angeles, has awarded a contract for the erection of a one-story machine shop addition, 30 x 100 ft., on Railroad Street. The company specializes in the manufacture of tools and dies.

The California Aircraft Corporation, 2108 West Seventh Street, Los Angeles, has been incorporated with a capital of $250,000 to operate a plant for the manufacture of aeroplanes and other aircraft. George E. Moore, 738 South Coronado Street; Robert L. Bailey, 832 South Hope Street; and Bert Gilhousen, 1207 Ardmore Avenue, are the incorporators.

The Little Giant Heating & Lighting Co., Los Angeles, has been incorporated with a capital of $100,000, to manufacture heating and lighting systems. A. L. Davison, 712 H. W. Hellman Building; D. S. Collins, 4942 Lynn Street; and S. V. Halstead, 629 South Flower Street, are the incorporators.

The Haft Fuel Machine Corporation, O. T. Johnson Building, Los Angeles, manufacturer of fuel burning machinery, will build a one-story shop extension on West Pico Street, about 30 x 50 ft.

Throop College, Pasadena, Cal., will build a shop extension to its mechanical engineering laboratory, to be used for oil and gas engine work, with installation of equipment for practical instruction, including air compressors.

The City Council, Coalinga, Cal., is planning for the construction of a municipal ice-manufacturing and cold storage plant on property recently acquired.

The Southern Sierras Power Co., Riverside, Cal., has been granted permission to build an electric generating plant at Blythe. The company plans for the installation of a steam operated plant for initial service.

The Pacific Northwest

SEATTLE, WASH., June 26.

The lumber industry in the Pacific Northwest seems to be assured for the next 18 months. At least 100 ships, and possibly 150, will be built on this coast the remainder of this year and in 1918. Each ship will require close to 1,700,000 ft. of lumber. To meet the Government's specifications it will be necessary to cut 840,000,000 ft. and mills will be rushed to capacity. Statistics show orders far under normal and below production, while shipments exceed production, indicating that the immense stocks piled up in the early months of the year are being moved and that the car shortage is at an end for the time being.

Recent figures show that the shipbuilding payroll in Seattle is more than $1,200,000 monthly, compared with $200,000 a month of a year ago. The most significant development has been the organization of the large number of plants, subsidiary to shipbuilding, and which are now getting the business formerly given to Eastern companies. There are now 10,500 workers employed in Seattle shipbuilding plants and this force will be materially added to in the near future.

Figures recently compiled show that a total area of 336 acres of the waterfront of Seattle, valued at $4,635,000, has recently been acquired by manufacturing companies, and in practically every instance the purchase presages the establishment of another industrial plant in that section.

F. Rogers and others have leased waterfront at Astoria, Ore., and will install a wooden shipbuilding plant with four ways.

The port of Astoria commission, Astoria, Ore., will install a coal and general freight handling crane at a cost of $18,000.

The Seattle Construction & Dry Dock Co., Seattle, has contracted to build for the United States Shipping Board 10 one-type 7500-ton steel ships, each to be 396 ft. long, 56 ft. beam and 29 ft. 3 in. depth of hold.

The Union Iron Works has leased 600 ft. of water front at Juneau, Alaska, on which ways will be built for marine repairing.

The Department of Public Works, Seattle, Wash., will install four 10-ton hammerhead shipbuilding cranes at the new graving dock.

The Reedsport-Oregon Shipbuilding Co., Portland, has been incorporated with a capital stock of $25,000 by W. H. Curtis, Fred Spoeri and C. V. Cooper.

The Holstrom Shipbuilding Co., Seattle, has been incorporated with a capital stock of $250,000 by P. C. Shanstrom, G. C. Wheeler and Charles S. Gleason.

The Portland Galvanizing Works, Portland, has been incorporated with a capital stock of $25,000 by Martin Leiser, J. Supple and Fred A. Ballin.

Sanderson & Porter, New York, who hold contracts for 10 Government vessels, have leased a site of 20 acres at Raymond, Wash., and 10 ways will be constructed immediately. The first vessel will be launched April, 1918, and one every fifteen days thereafter.

The Stolt Nielson Steamship Co., Seattle, has been incorporated by representatives of the B. Stolt Neilson Co. of Norway, with a capital stock of $3,000,000.

The National Shipbuilding Co., Seattle, has been reorganized with O. D. Trieber president. The company has contracts for the construction of eight wooden ships and is now constructing two five-mast auxiliary schooners of 3500 tons.

The Phoenix Gas Engine Mfg. Co., Seattle, has been incorporated for $800,000 by C. B. Williams, A. E. Forsyth, G. W. Kemp and others.

The Puget Sound Corporation, Olympia, Wash., has been incorporated with a capital of $5,000,000, to build steel ships and machinery, own and operate power plants and engage in general manufacturing business. The incorporators are A. P. Gilles, Olympia, and A. C. Lindsay, P. H. Hoag and A. C. Phillips, all of Chicago.

The Marine Pipe & Machinery Co., Seattle, has awarded a contract for the construction of a two-story foundry and machine shop to cost $15,000.

The Hoods Mfg. Co., Seattle, has let contract for a foundry, 70 x 100 ft.

The Portland Galvanizing Works, Portland, Martin Leiser, owner, plans to immediately double the capacity of its plant. New machinery will be installed and the improvements will cost $25,000.

The Dominion Products Co., New Westminster, B. C., has completed plans for construction of an addition, 115 x 150 ft., to its plant at New Westminster. The equipment to be installed includes fans and motors, four mechanical stokers and equipment and three high pressure boilers, 18 ft. x 72 in.

The Idaho Power Co., Nampa, Idaho, plans the installation of six new units to furnish 8000 hp. at the Swan Falls plant on Snake River at an expenditure of more than $500,000.

The Kruse & Banks Shipyard, North Bend, Ore., plan to construct five vessels for the jitney fleet. Several ways will be added to the yards.

The Deninie Aircraft Co., Spokane, Wash., has leased three brick buildings and five acres of ground and will immediately begin the manufacture of 10 standard tractor airplanes for the Government. O. H. Carver is general manager. The plant will have capacity of 30 machines a year, each costing, fully equipped, $15,000.

The Oregon Navigation Co., Portland, Ore., has been organized by George E. Hardy & Co. with a capital stock of $250,000. It will construct sailing vessels costing approximately $120,000 each.

Canada

TORONTO, July 2.

The Acadia Gas Engines, Ltd., Bridgewater, N. S., organized to take over the Acadia Gas Engines Co., is issuing bonds, amounting to $75,000, the proceeds to be used for making additions to the plant and to purchase equipment. It also proposes to manufacture new lines.

The Canadian Copper Co., Copper Cliff, Ont., will be in the market for two or three centrifugal pumps for its sewage pumping station being erected at a cost of $20,000.

John Watson, Fergus, Ont., will erect a sawmill to cost $10,000 to relace the one recently destroyed by fire. New machinery and equipment will be required.

The Canada Screw Co., 334 Wellington Street, West, Hamilton, Ont., purposes to build an addition to its factory at a cost of $100,000.

The Atlas Films of Canada, Ltd., Toronto, has been incorporated with a capital stock of $75,000 by Frank Regan, Daniel P. Kelly, 145 Brunswick Avenue; John Callahan and others, to manufacture motion picture machines, etc.

The Sterling Iron & Metals, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Lionel Davis, 82 Kendal Avenue; Myrtle Young, Ethel Frise and others, to manufacture iron, steel, tools, machinery, etc.

The Mono Lino Typesetting Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by William F. Addison, 152 Pearl Street; Henry C. Mainprice, William R. Adamson and others, to manufacture type, typesetting machines, tools, etc.

The Reeder-Weeks Mfg. Co., Ltd., Hamilton, has been incorporated with a capital stock of $40,000 by Robert Weeks, Lewis P. Reeder, William Lees and others, to manufacture automobile tire chains, machinery, tools, and implements.

Beatty Brothers, York Street, London, Ont., proposes to build a factory and boiler house at a cost of $50,000.

The Booth-Coulter Copper & Brass Co., 115 Sumach Street, Toronto, is building an addition to its plant to cost $7,000.

The John Morrow Screw & Nut Co., Hamilton, is building an addition to its plant to cost $30,000.

The testing department of the Canadian General Electric Co., Peterboro, Ont., was damaged by fire, with a loss of $10,000.

The Pennsylvania Coal & Transportation Co., Ltd., Montreal, has been incorporated with a capital stock of $2,000,000, by Gerald A. Coughlin, Francis K. Bush, George R. Drennan and others, to build ships, engines, boilers, machinery, etc.

The Electric Steel & Engineering, Ltd., Welland, Ont., has been incorporated with a capital stock of $2,000,000 by James S. Lovell, 119 Madison Avenue; Charles D. Magee, 300 St. George Street; William Bain, 189 College Street, and others, all of Toronto, to manufacture iron, steel, machinery, tools, etc.

Slater & Barnard, Ltd., Hamilton, have been incorporated with a capital stock of $1,000,000 by Norman Slater, Thomas H. Barnard, James W. King and others, to manufacture hardware, tools, machines, etc. It is stated that the incorporation provides for the amalgamation of the Allith Mfg. Co., and of the Acme Stamp & Tool Co., but the management of the companies will be unchanged.

The nosing room of the shell department of the Goold, Shapley & Muir plant, Brantford, Ont., was damaged by fire June 24, amounting to about $25,000. Considerable machinery was destroyed.

Government Purchases

WASHINGTON, June 30.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until July 10, schedule 1289, for two universal back geared milling machines and one 60-in. portable slotting machine for Philadelphia.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until July 9, 1917, for furnishing electric traveling cranes in the structural shop at the navy yard, New York.

Proposals will be received at the Bureau of Yards and Docks, Navy Department, Washington, July 9, 1917, for eight 600-horsepower boilers with superheaters and stokers for the navy yard, Norfolk, Va.; six 600-horsepower boilers with superheaters and stokers for the navy yard, Philadelphia, Pa.; two 600-horsepower boilers with superheaters and oil-burning equipment for the navy yard, Puget Sound, Wash.; one 400-horsepower boiler with stoker and stokers for seven existing boilers for the Naval Academy, Annapolis, Md., stokers for ten existing boilers for the navy yard, Washington; two 350-horsepower boilers with superheaters and stokers for the navy yard, Charleston, S. C., and two 600-horsepower boilers with superheaters and oil-burning equipment for the naval station, Pearl Harbor, Hawaii.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, on June 26 for furnishing material and supplies for the naval service as follows:

Schedule 1242. Ordnance. Class 162. Washington—1 motor driven milling machine—Bid 63, $3,155 and $3,095; 88, $3,499.

Schedule 1243. Ordnance. Class 163. South Charleston, W. Va.—Ingot manipulators—Bid 62, $32,150; 118, $21,600.

Schedule 1244. Steam Engineering. Class 171. Brooklyn—1 motor-driven lathe—Bid 45, $1,520; 52, $1,218; 63, $1,540 and $1,489; 67, $1,860; 68, $1,622; 101, $1,160. Class 172. Brooklyn—1 motor-driven milling machine—No bids. Class 173. Brooklyn—1 motor-driven drill—Bid 36, $195; 68, $605 and $735. Class 174. Brooklyn—1 motor-driven grinder—Bid 17, $214.30; 18, $265.45; 38, $195; 46, $245; 52, $236; 68, $265.45. Class 175. Brooklyn—1 motor-driven grindstone—Bid 63, $241.50; 68, $237.

The following bids were received by the Board of Awards, Department of Agriculture, Washington, June 22, for furnishing motor-driven drill press: Fairbanks Co., Baltimore, Md., 23 in. press, $404; December 30. Kemp Machinery Co., Baltimore, Md., 21 in. press, $660; 130 days.

The names of the bidders and the numbers under which they are designated in the above list, are as follows: Bid 17, The Cincinnati Electrical Tool Co., 650 Evans Street, Cincinnati, O.; 18, Jas. Clarke, Jr., Electric Co., 520 N. Main Street, Louisville, Ky.; 36, The Greendale Distilling Co., Lawrenceburg, Ind.; 38, The Guerber Engineering Co., Bethlehem, Pa.; 45, Inter-Continental Machinery Corporation, 165 Broadway, New York; 46, W. Irwin Cheyney, Heed Bldg., Philadelphia, 52, Kemp Machinery Co., 223 North Calvert Street, Baltimore, Md.; 62, The Morgan Engineering Co., Alliance, Ohio; 63, Manning, Maxwell & Moore, Inc., 119 W. 40th Street, New York; 67, Niles-Bement-Pond Co., 111 Broadway, New York; 68, D. Nast Machinery Co., Bourse Bldg., Philadelphia; 88, Sherritt & Stoer Co. (Inc.), 603 Finance Building, Philadelphia; 101, Swind Machinery Co., Widener Building, Philadelphia.